



US009237810B2

(12) **United States Patent**
Voris

(10) **Patent No.:** **US 9,237,810 B2**
(45) **Date of Patent:** **Jan. 19, 2016**

(54) **FOLDING FURNITURE**

(56) **References Cited**

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(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/301,987**

(22) Filed: **Jun. 11, 2014**

(65) **Prior Publication Data**

US 2014/0300144 A1 Oct. 9, 2014

U.S. PATENT DOCUMENTS

172,623	A	1/1876	Golightly
195,545	A	9/1877	Sutherland
250,343	A	12/1881	Cluff
389,572	A	9/1888	Holden et al.
417,819	A	12/1889	Gage
444,992	A	1/1891	Pohl
808,098	A	12/1905	Lewis
933,624	A	9/1909	Chandler
1,146,358	A	7/1915	Slatter et al.
1,158,212	A	10/1915	Henderson
1,163,263	A	12/1915	Rudduck
1,262,110	A	4/1918	Slack
1,419,947	A	6/1922	Schouten
1,686,599	A	10/1928	Corser et al.
1,841,744	A	1/1932	Lawrence
2,247,799	A	7/1941	Boardman
2,312,602	A	3/1943	Taylor
2,555,566	A	6/1951	Bleck

(Continued)

FOREIGN PATENT DOCUMENTS

GB	0620711	3/1949
GB	0663478	12/1951

(Continued)

OTHER PUBLICATIONS

International Search Report dated Nov. 28, 2012, for PCT/US2012/
035016.

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(57) **ABSTRACT**

A folding chair includes a frame, a seat bottom coupled to the
frame, and legs for supporting the seat bottom in a horizontal
position relative to the frame. The frame is formed to include
a seat back.

9 Claims, 14 Drawing Sheets

Related U.S. Application Data

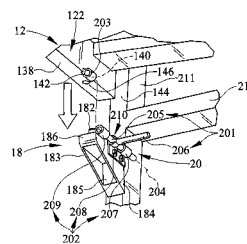
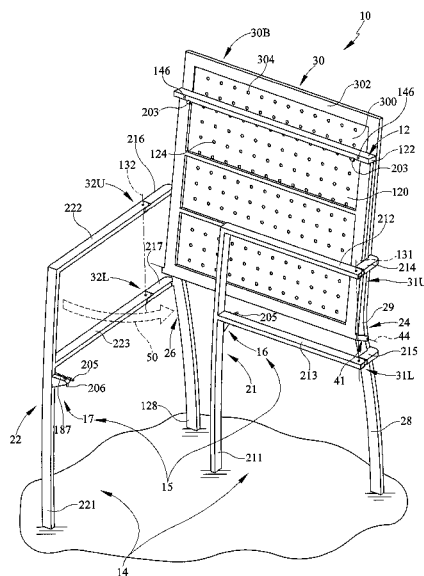
(63) Continuation of application No. 13/455,960, filed on
Apr. 25, 2012, now Pat. No. 8,882,189.

(60) Provisional application No. 61/478,770, filed on Apr.
25, 2011.

(51) **Int. Cl.**
A47C 4/04 (2006.01)
A47C 4/00 (2006.01)

(52) **U.S. Cl.**
CPC . **A47C 4/045** (2013.01); **A47C 4/00** (2013.01);
A47C 4/04 (2013.01)

(58) **Field of Classification Search**
CPC A47C 4/04
USPC 297/6, 36, 59, 60
See application file for complete search history.



(56)

References Cited

U.S. PATENT DOCUMENTS

2,563,553 A 8/1951 Rosenjack
 2,752,218 A 6/1956 Shea, Sr.
 2,774,413 A 12/1956 Shepherdson
 2,849,054 A 8/1958 Shepherdson
 2,860,692 A 11/1958 Hamilton
 2,966,204 A 12/1960 Caravias
 2,978,012 A 4/1961 Norseen
 3,021,175 A 2/1962 Norquist
 3,086,813 A 4/1963 Best et al.
 3,127,218 A 3/1964 Banke
 3,136,272 A 6/1964 Sprigman
 3,199,915 A 8/1965 Hamilton et al.
 3,709,167 A 1/1973 Sprigman
 4,052,087 A 10/1977 Gagliardi
 4,058,341 A 11/1977 Prins
 4,162,806 A 7/1979 Cho
 4,193,630 A 3/1980 Steele
 4,211,450 A 7/1980 Sutter
 4,218,089 A 8/1980 Beltrami et al.
 4,244,619 A 1/1981 Yoshimura
 4,253,203 A 3/1981 Thomas
 4,359,243 A 11/1982 Crutcher
 4,359,791 A 11/1982 Thomas
 4,475,256 A 10/1984 Hatala
 4,520,515 A 6/1985 Hatala
 4,685,725 A 8/1987 Helfrich
 5,096,259 A 3/1992 Stanfield
 5,170,519 A 12/1992 Meade

5,253,921 A 10/1993 Boulet
 5,335,377 A 8/1994 Masyada et al.
 5,499,857 A 3/1996 Lynch, Jr.
 5,718,473 A 2/1998 Lynch, Jr.
 5,911,469 A 6/1999 Young
 6,015,185 A 1/2000 Buono
 6,056,353 A 5/2000 Meara
 6,099,073 A 8/2000 Bruschi
 6,135,557 A 10/2000 Gustafsson
 6,244,657 B1 6/2001 Momose
 6,257,660 B1 7/2001 Calvey
 6,270,156 B1 8/2001 Metzger et al.
 6,543,842 B2 4/2003 Haney
 6,682,138 B2 1/2004 Adams et al.
 6,863,341 B1 3/2005 Wen
 6,871,906 B2 3/2005 Haney
 6,874,850 B2 4/2005 Berkowicz
 6,953,221 B1 10/2005 Tseng et al.
 6,981,741 B2 1/2006 Sirjoo
 6,997,115 B2 2/2006 Lockwood et al.
 7,014,261 B2 3/2006 Haney
 7,021,705 B1 4/2006 Niermeyer et al.
 7,401,850 B2 7/2008 Micheel
 7,429,084 B2 9/2008 Diedrich
 7,549,702 B2 6/2009 Meyers

FOREIGN PATENT DOCUMENTS

JP 2002165666 6/2002
 KR 1020060114946 11/2006
 KR 1020100111412 10/2010

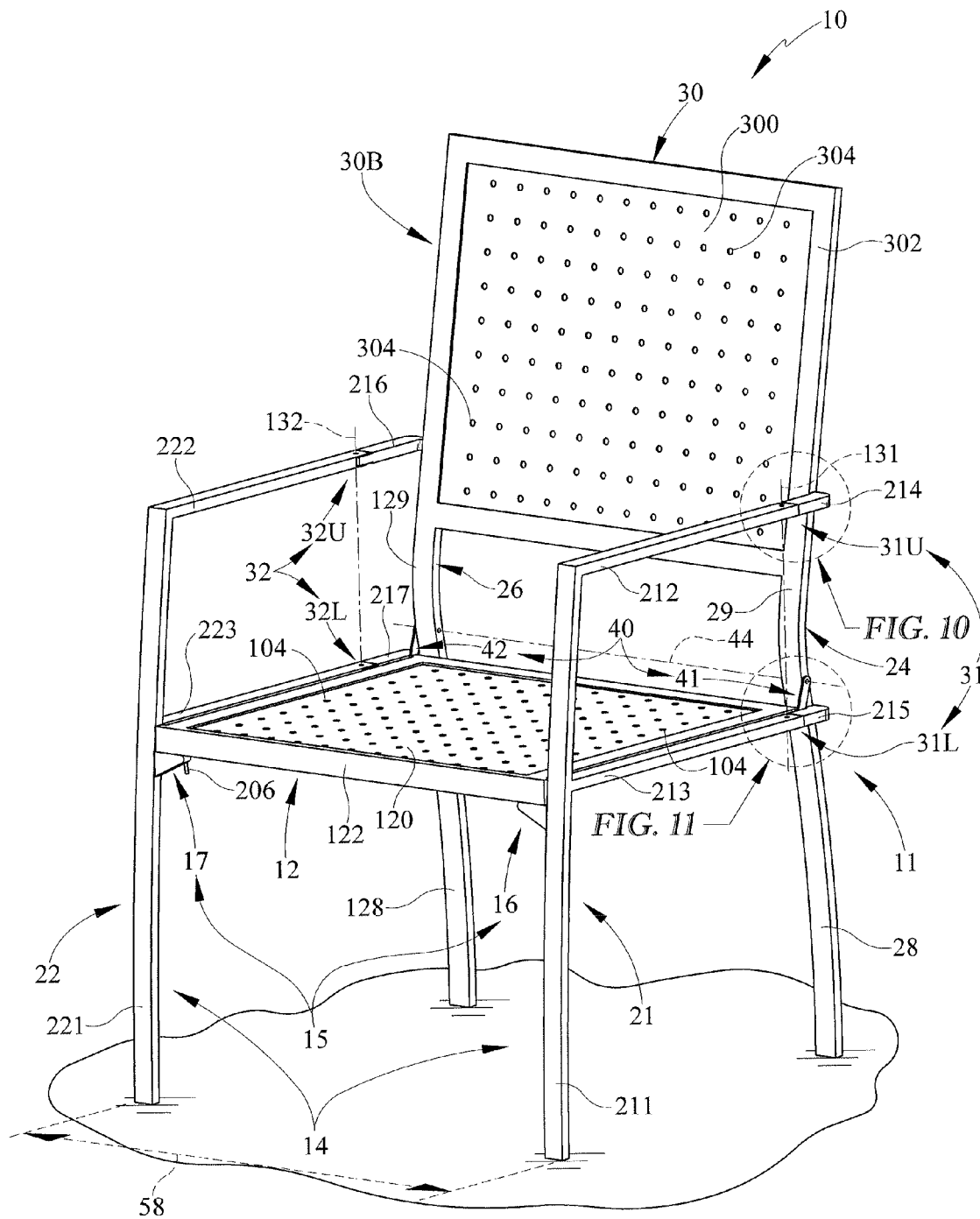


FIG. 1

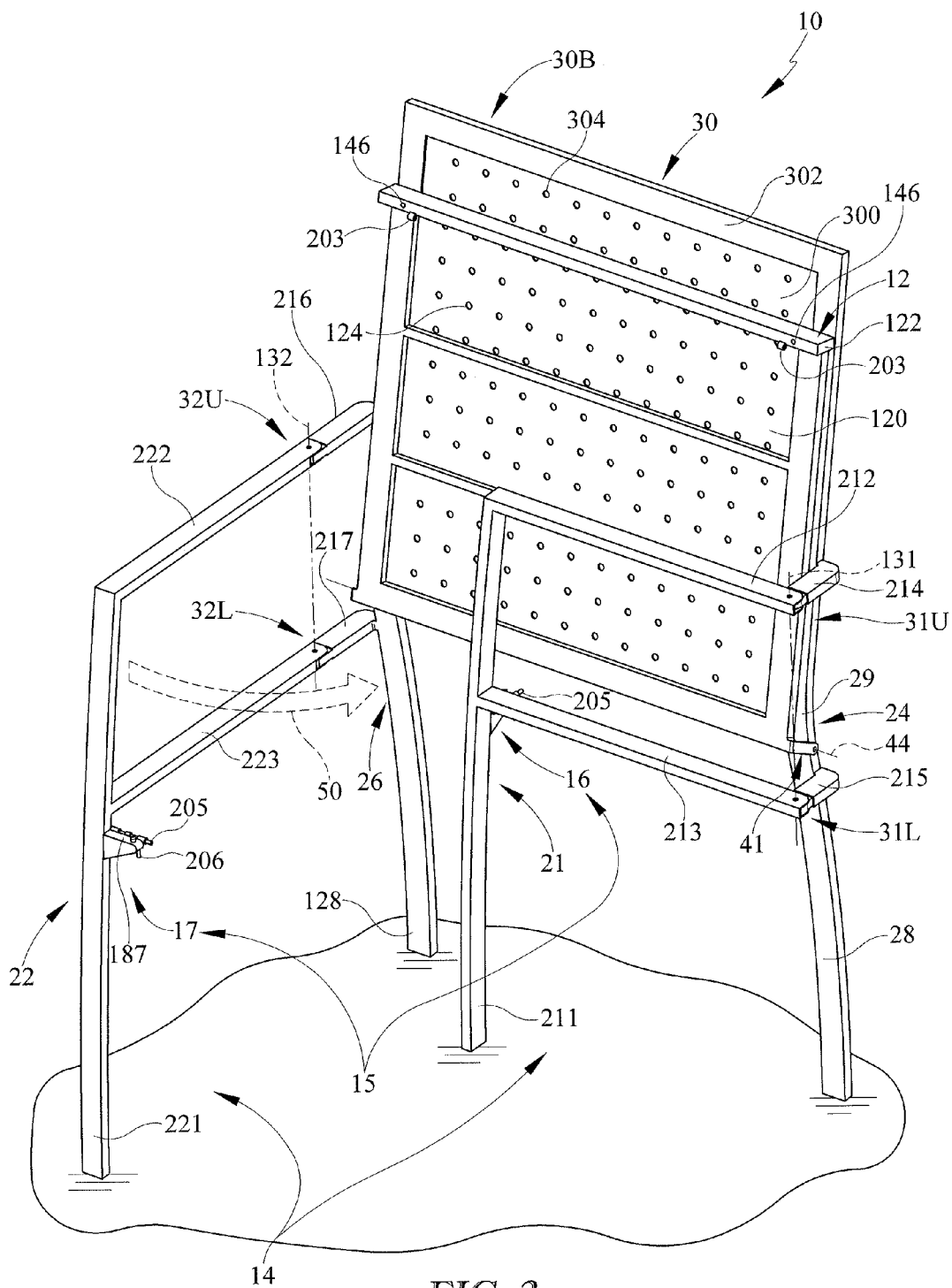


FIG. 2

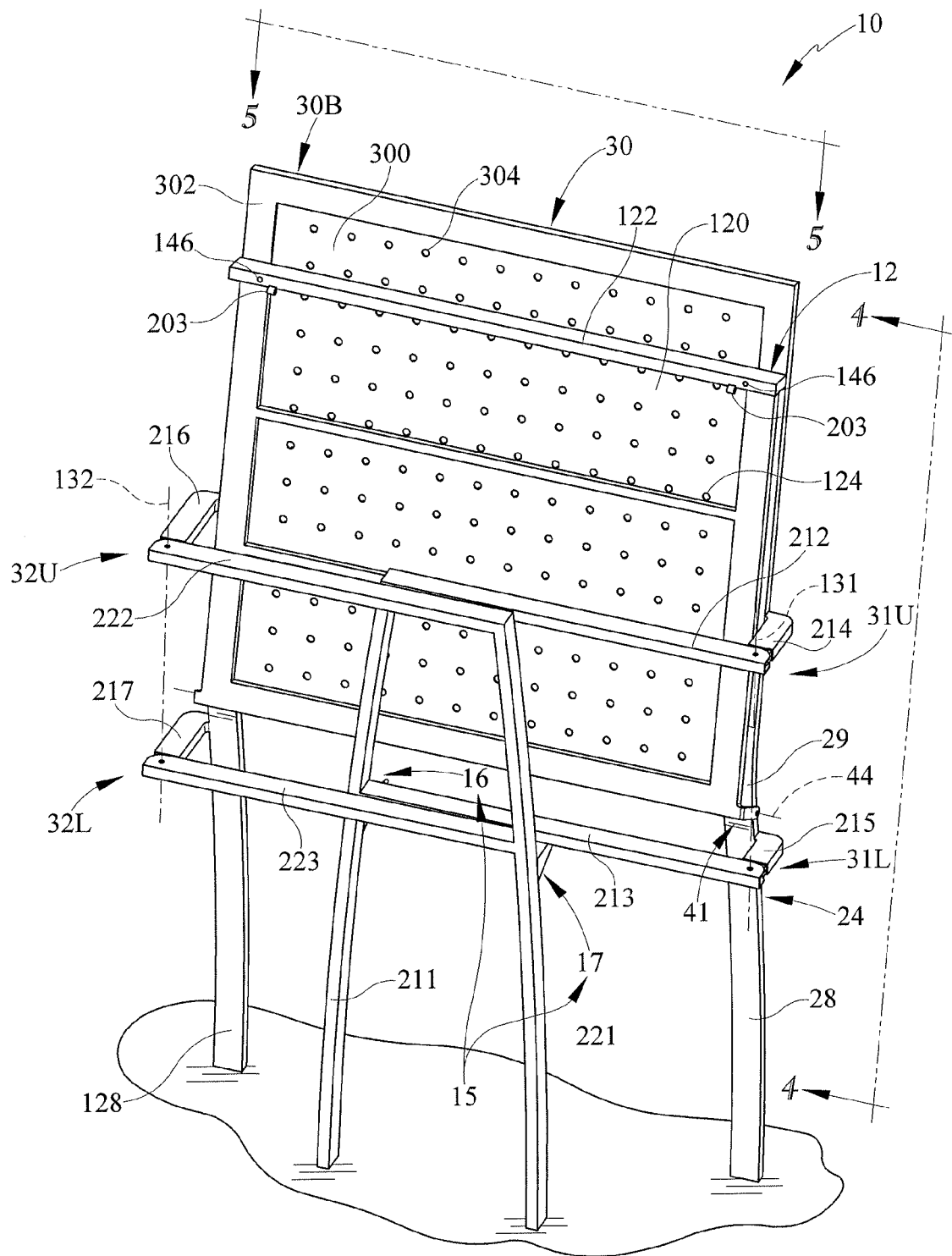


FIG. 3

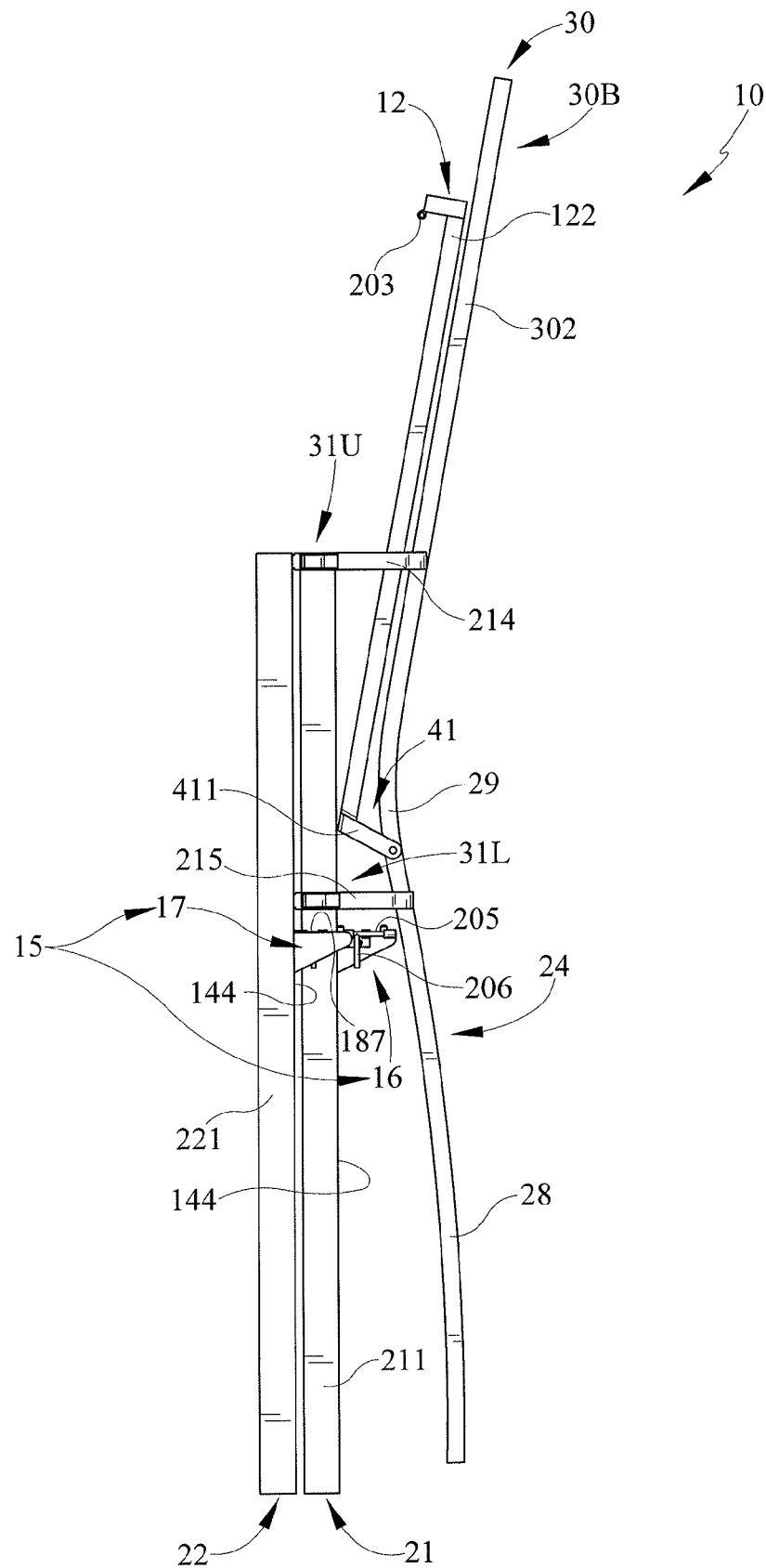


FIG. 4

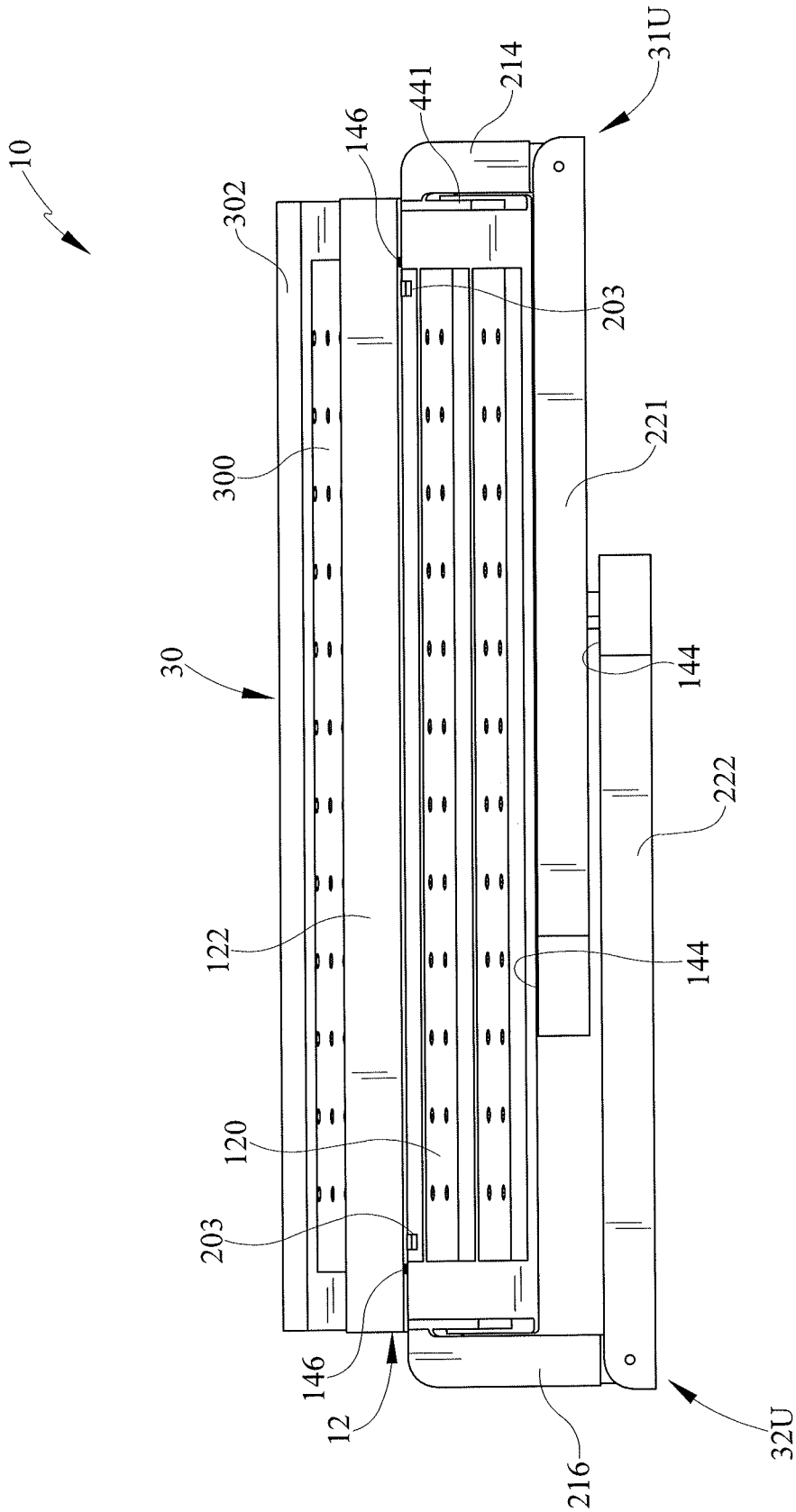


FIG. 5

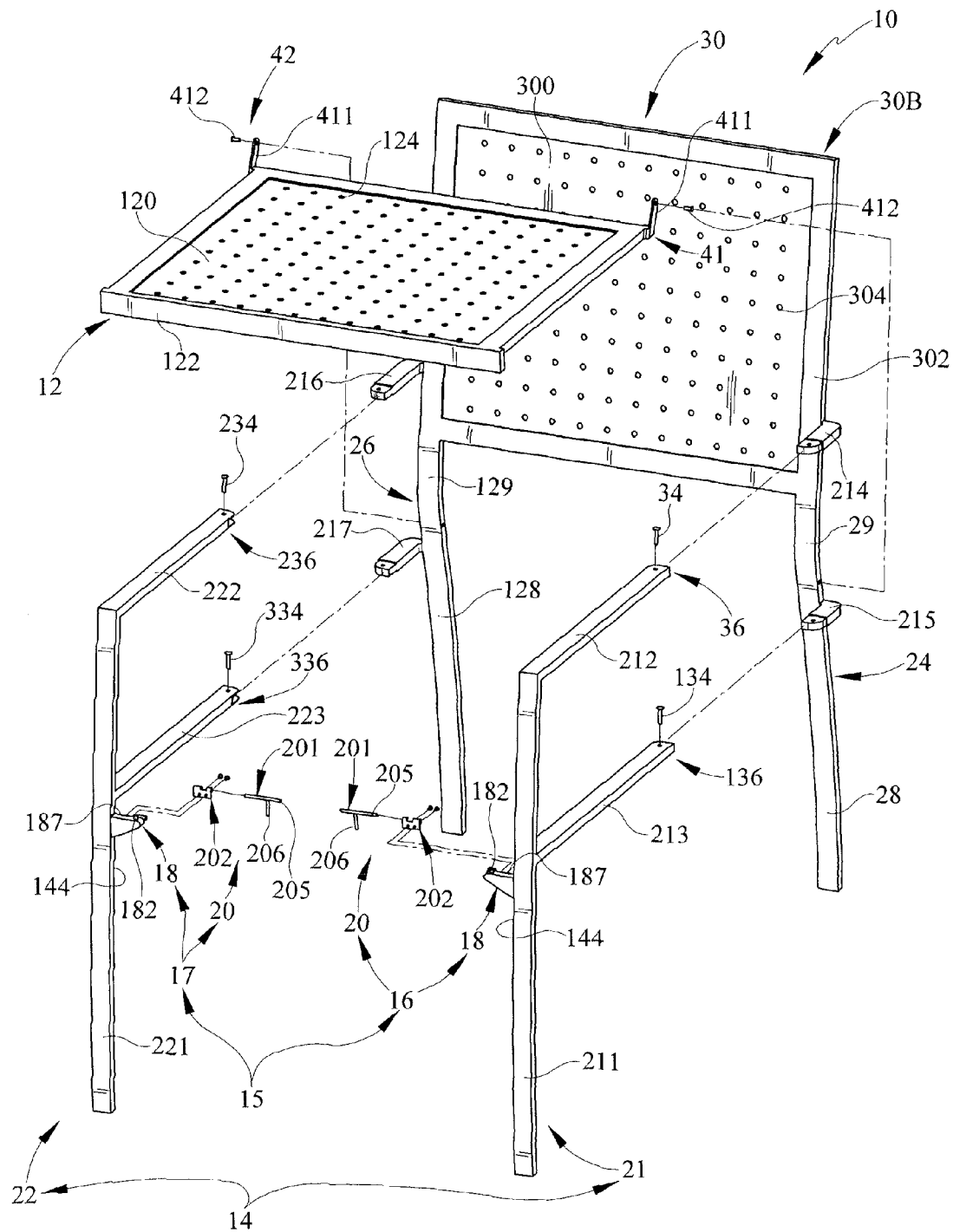
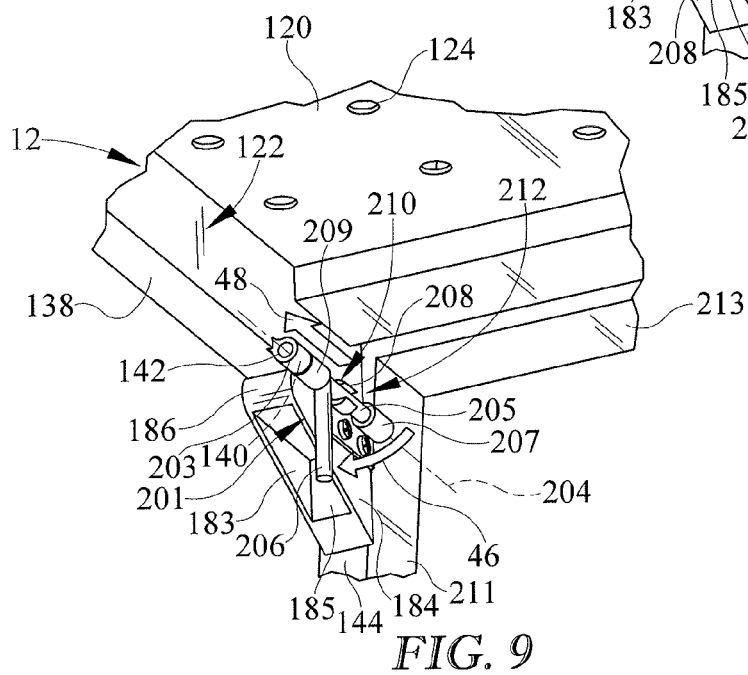
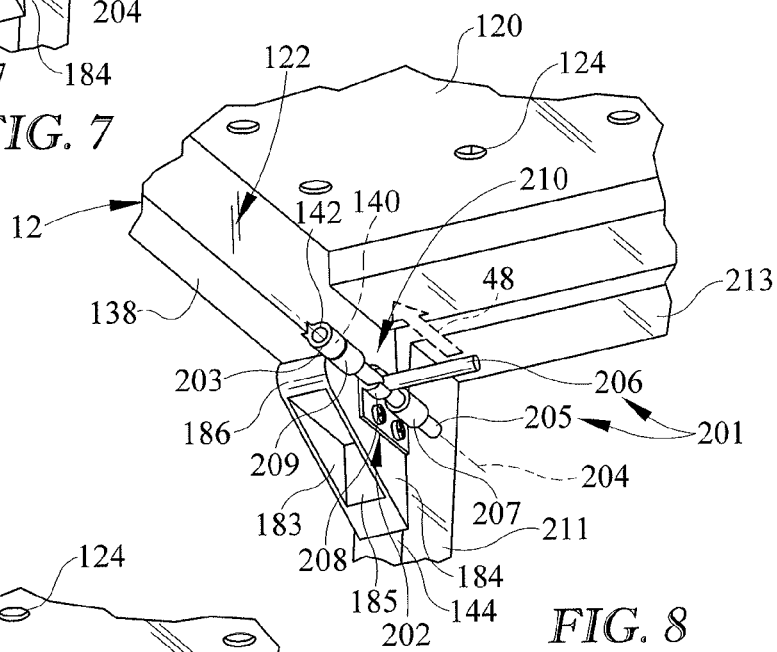
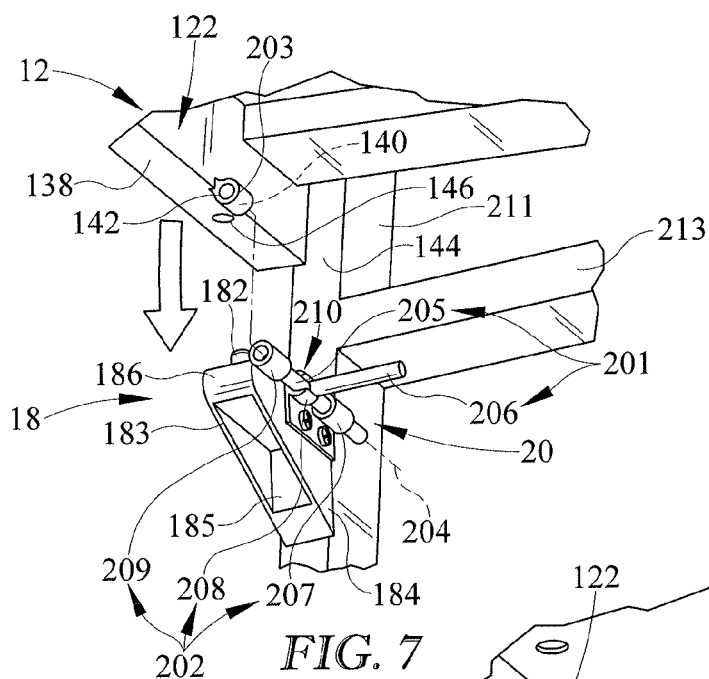


FIG. 6



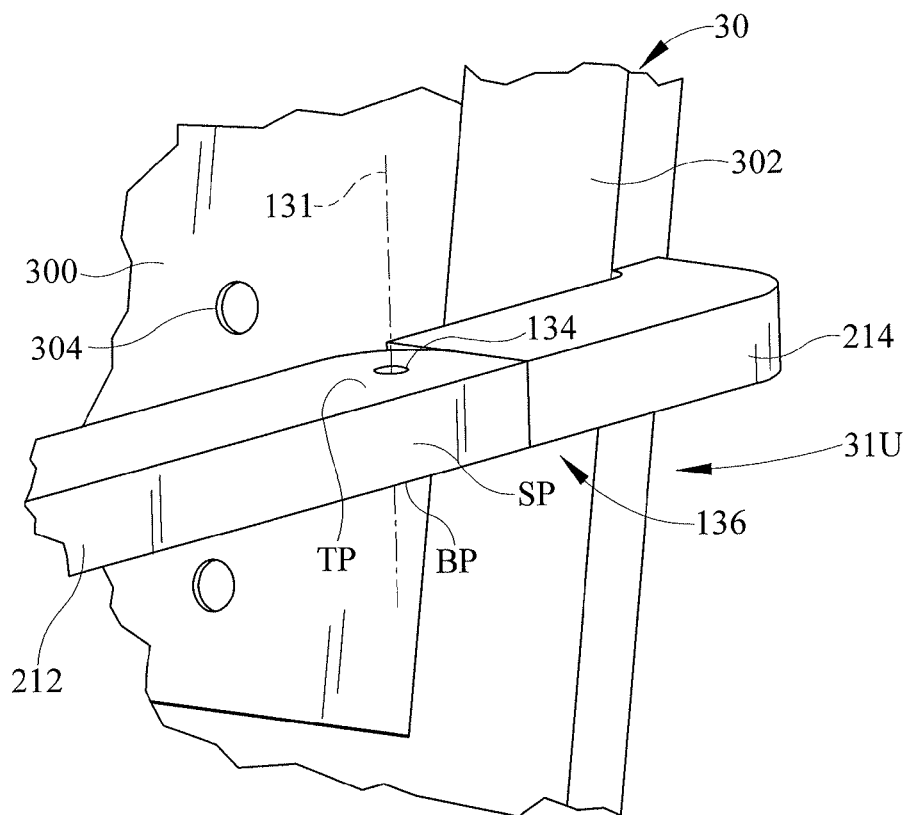


FIG. 10

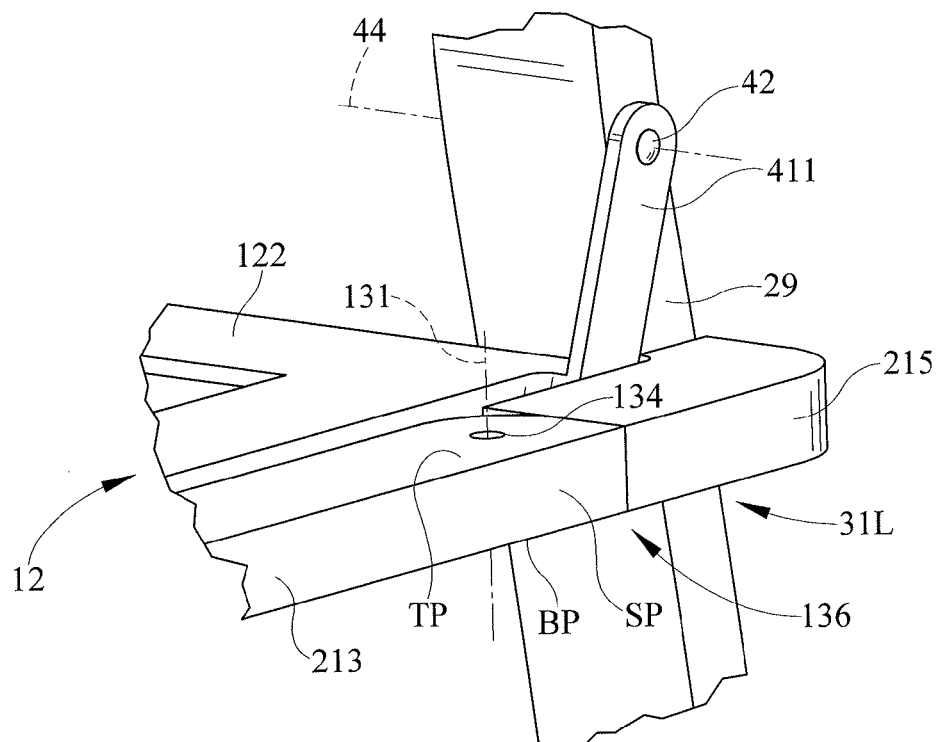
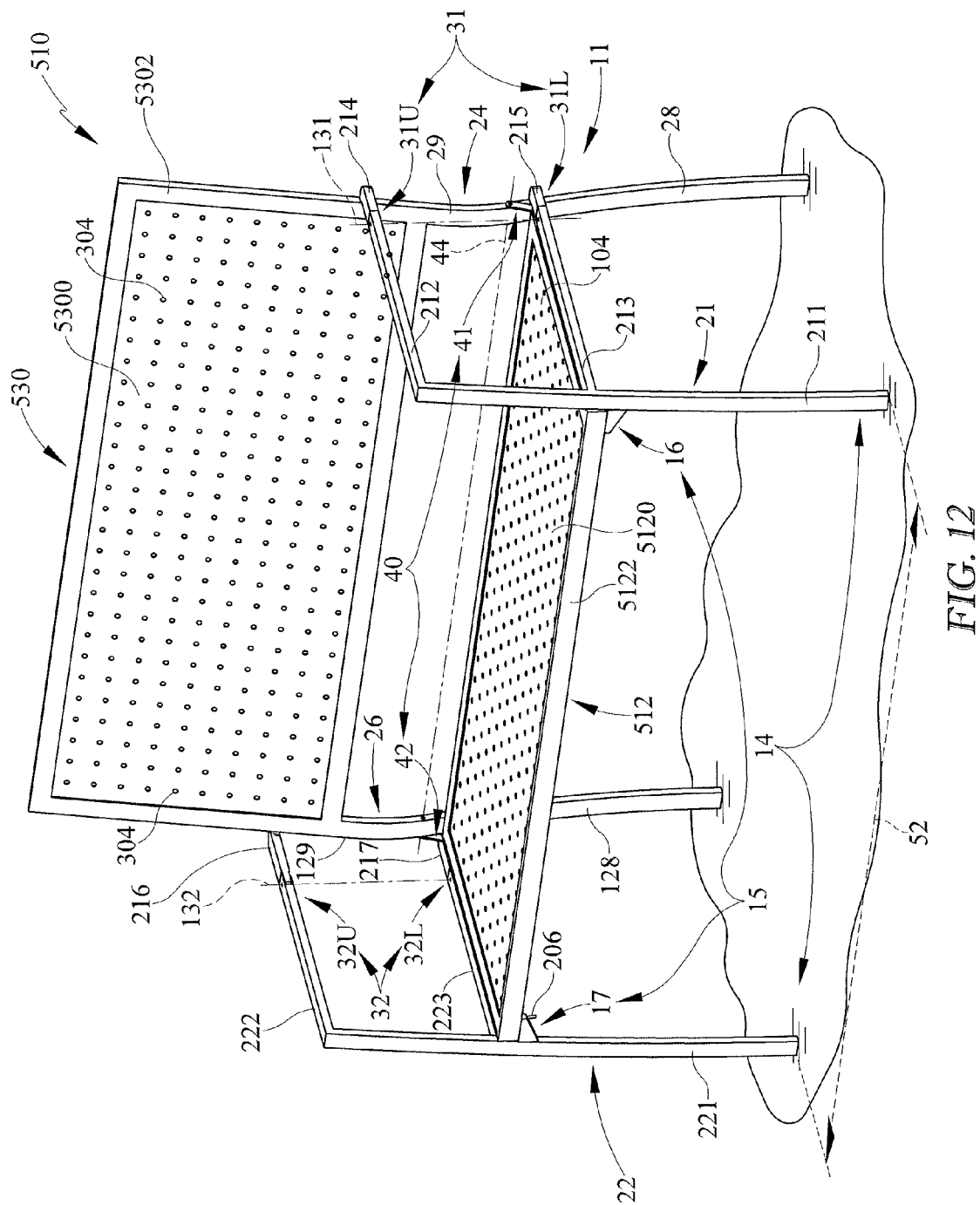


FIG. 11



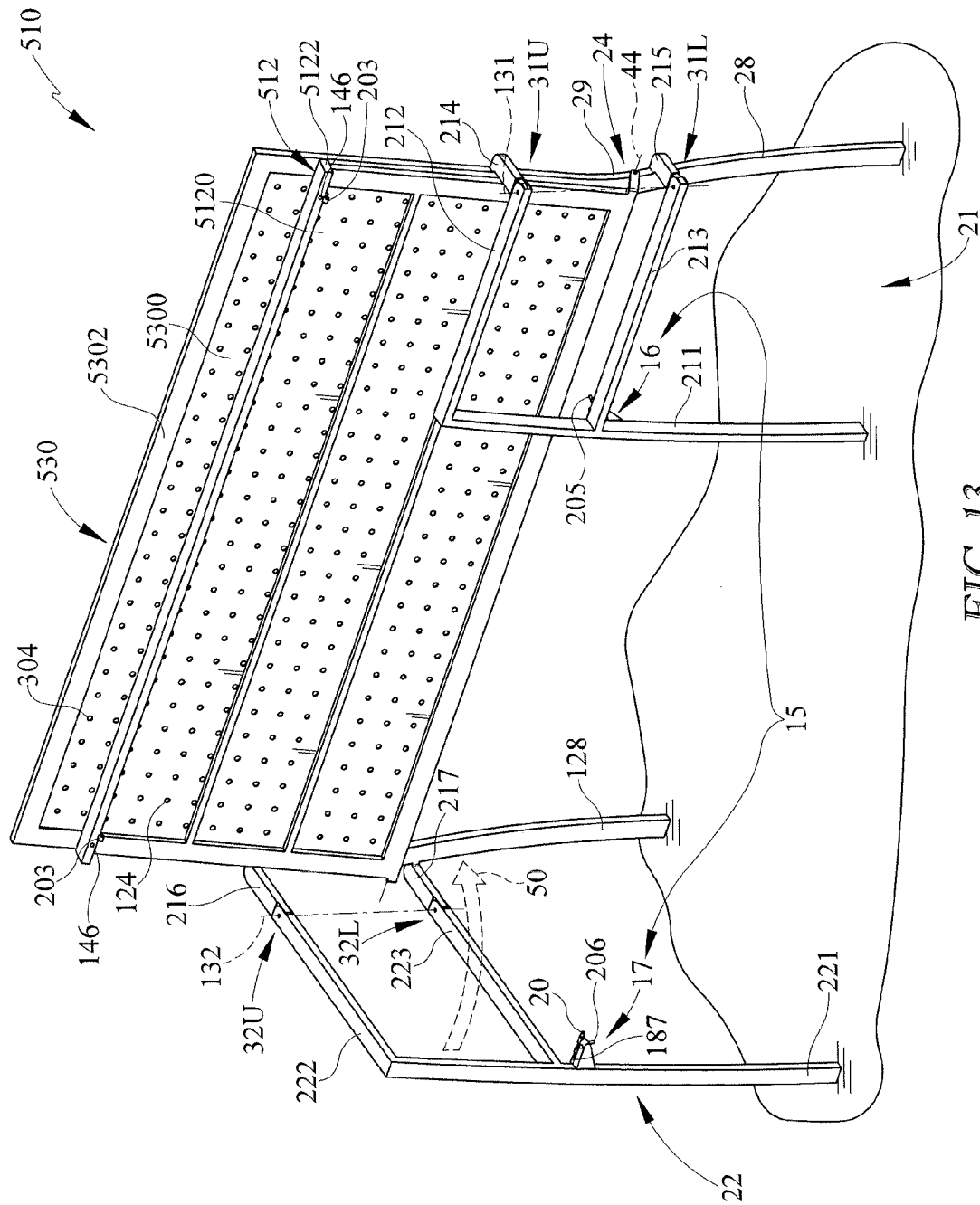


FIG. 13

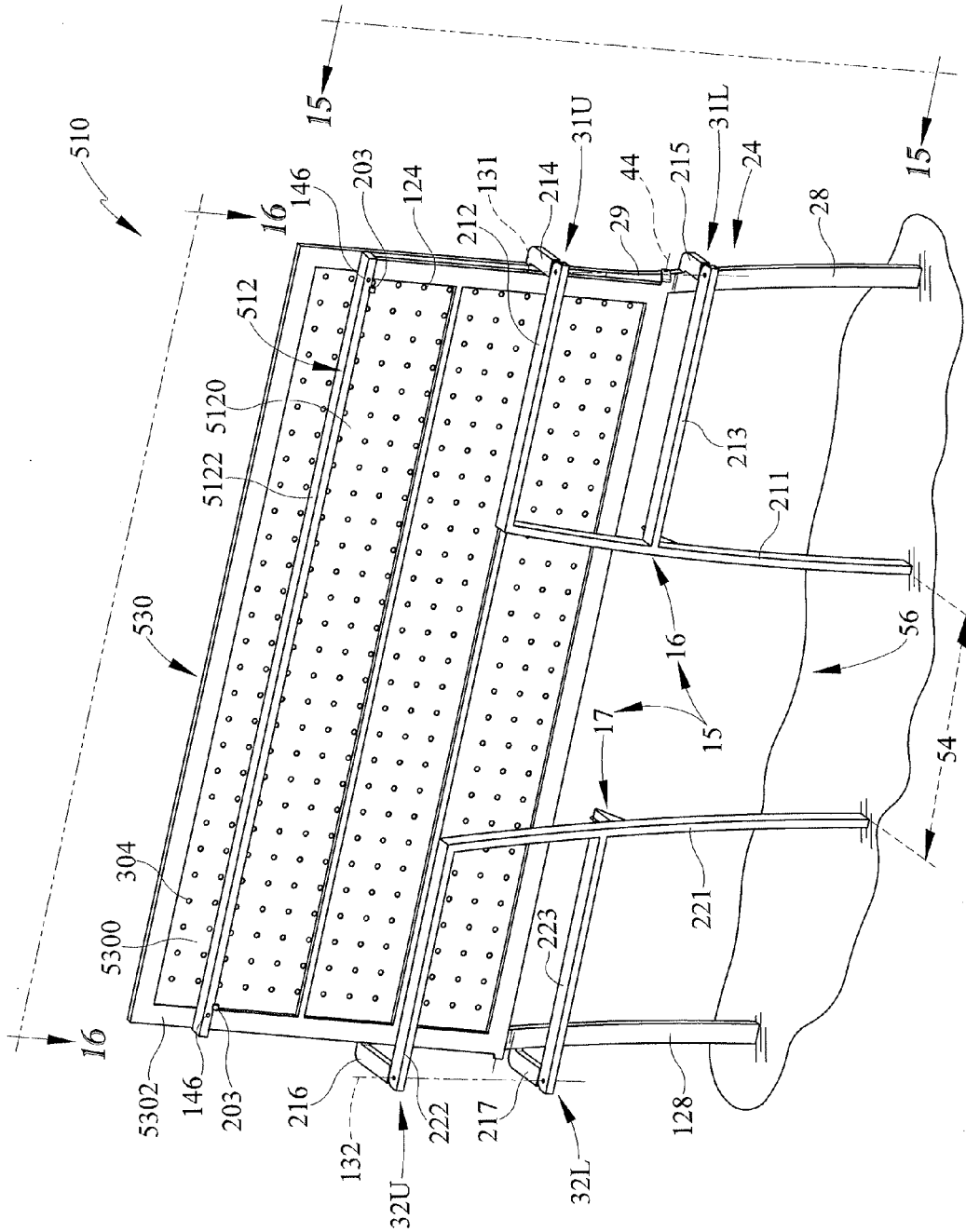


FIG. 14

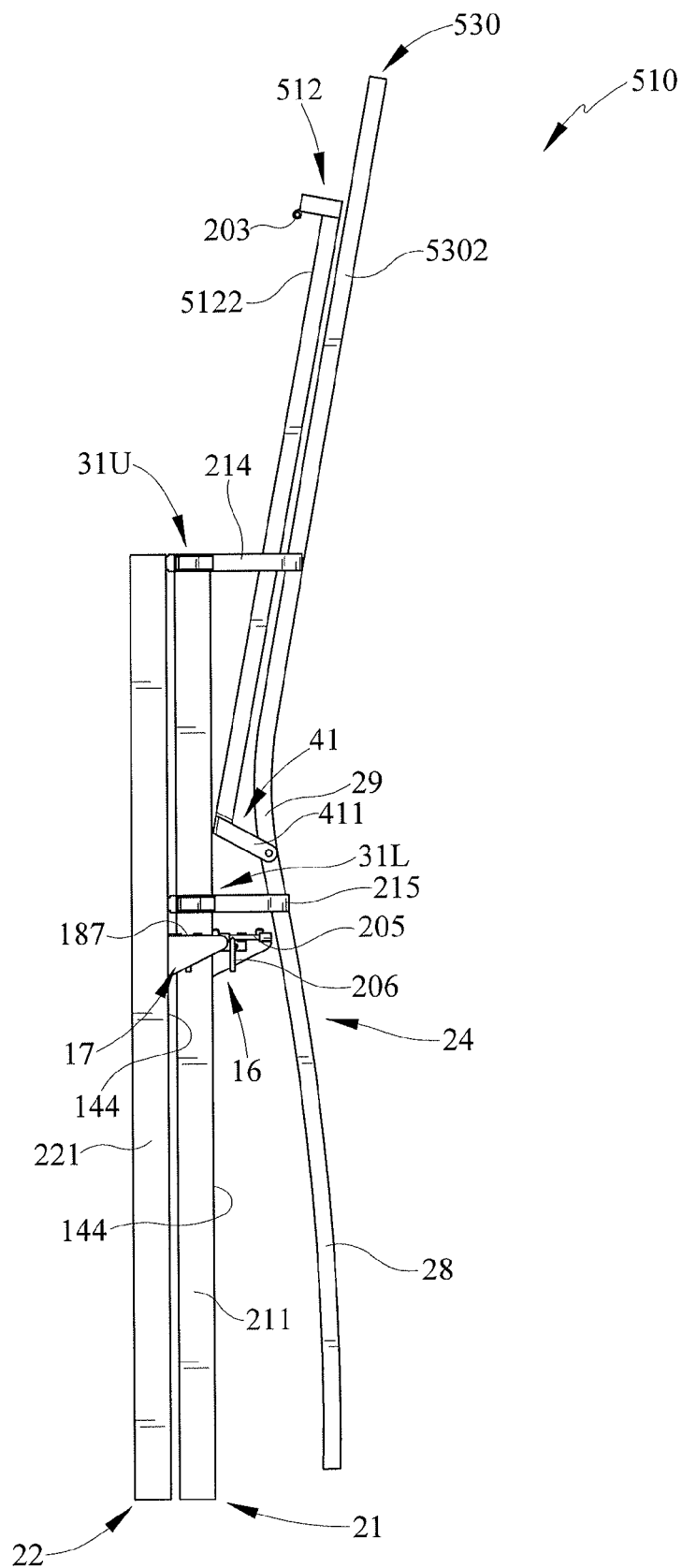


FIG. 15

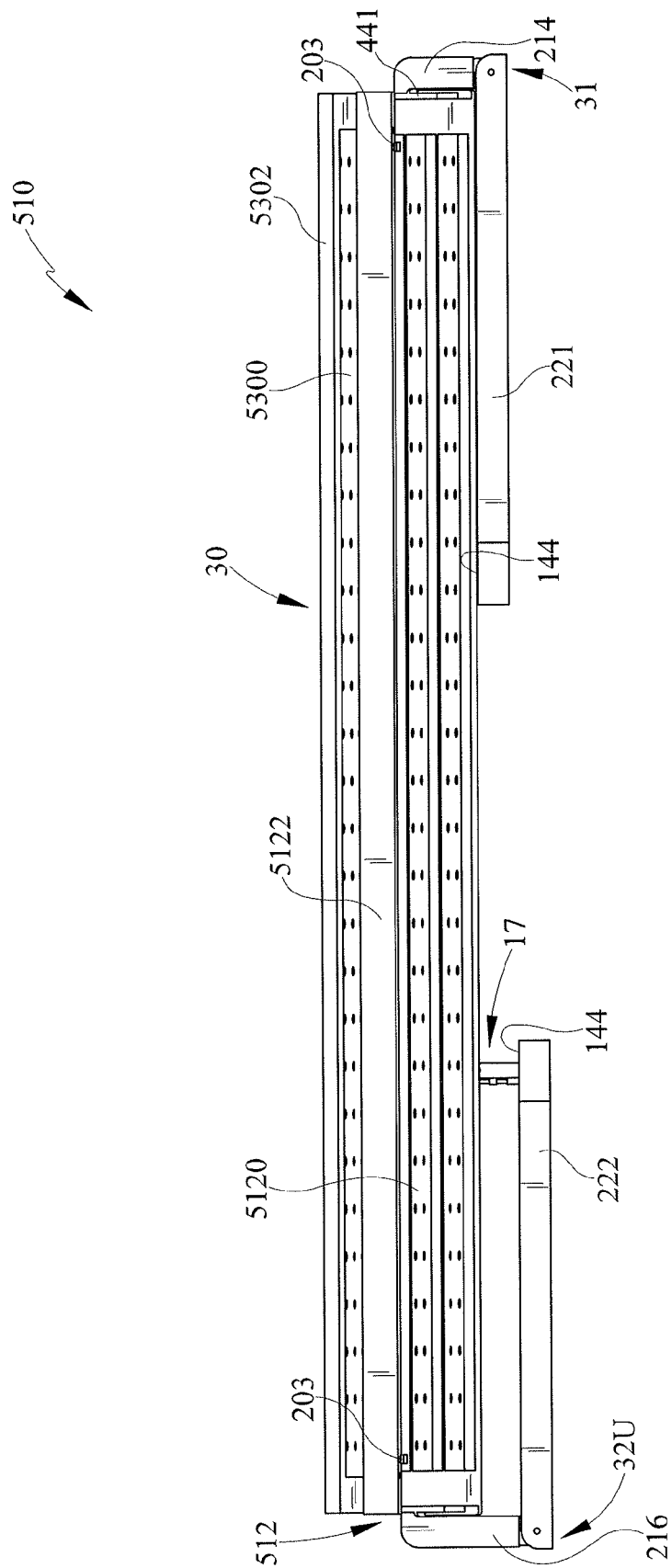


FIG. 16

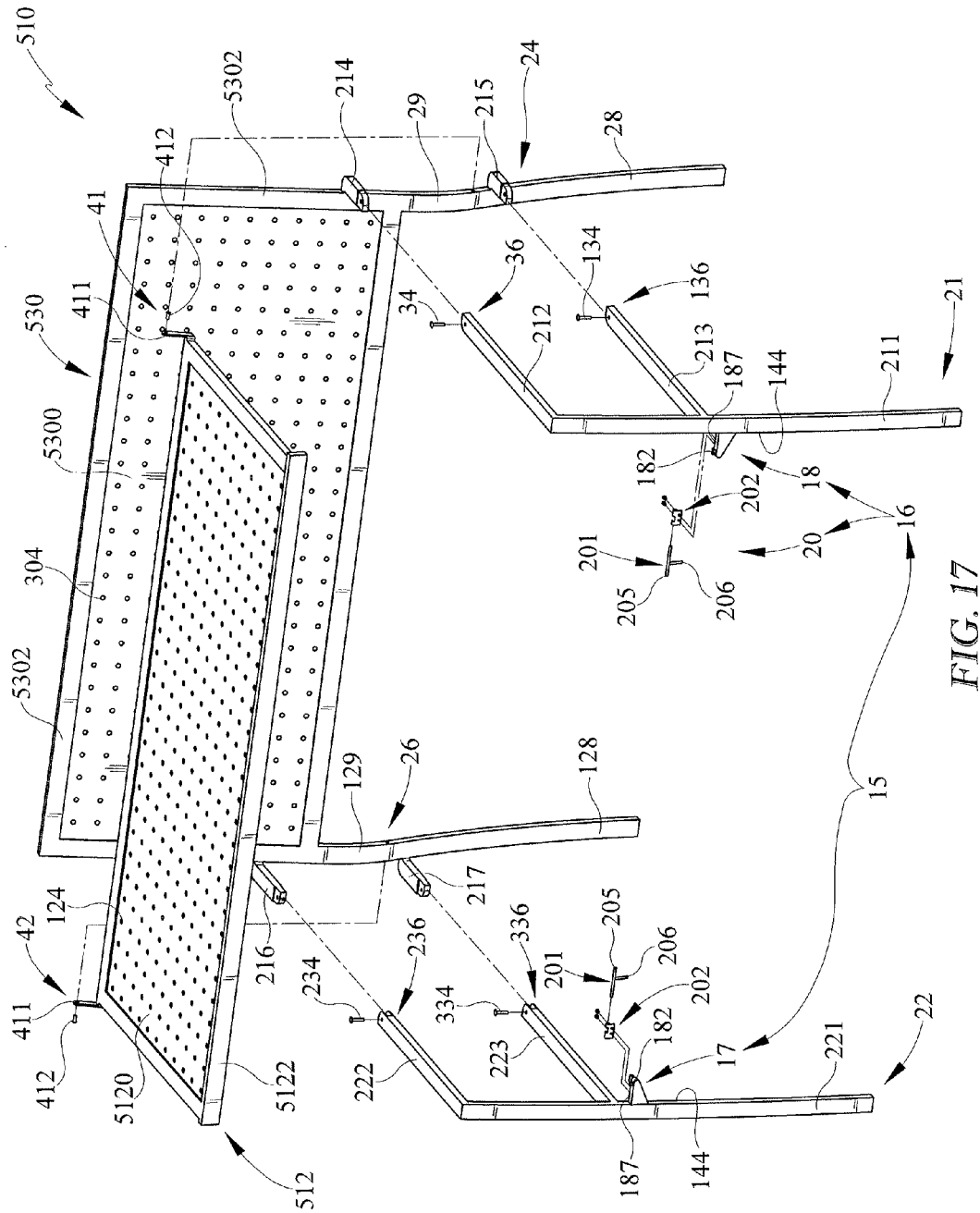


FIG. 17

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FOLDING FURNITURE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 13/455,960, filed Apr. 25, 2012, which claims priority to U.S. Provisional Application Ser. No. 61/478,770, filed Apr. 25, 2011, which are expressly incorporated by reference herein.

BACKGROUND

The present disclosure relates to furniture, and in particular, to folding furniture. More particularly, the present disclosure relates to a folding chair and a folding bench.

SUMMARY

A folding chair in accordance with the present disclosure includes a frame, a seat bottom, and a seat-bottom support. The seat bottom is movable relative to the frame between an unfolded use position and a compact folded storage position.

In illustrative embodiments, the seat-bottom support is retractable and includes first and second gatefold leg units. The first gatefold leg unit is coupled to one side of the frame using a first hinge included in the folding chair. The second gatefold leg unit is coupled to an opposite side of the frame using a second hinge included in the folding chair. When the gatefold leg units are unfolded, they underlie and support the seat bottom in its unfolded use position.

In illustrative embodiments, seat-bottom retainers are coupled to each of the first and second gatefold leg units and are configured to guide the seat bottom as the seat moves downwardly into the unfolded use position and retain the seat bottom in the extended use position. A first seat-bottom retainer provides lock means for interconnecting one side of the seat bottom to the first gatefold leg unit to cause movement of the seat bottom to be blocked in response to engagement of the lock means by a user in the field. A second seat-bottom retainer provides lock means for interconnecting an opposite side of the seat bottom to the second gatefold leg unit to cause movement of the seat bottom to be blocked in response to engagement of the lock means by a user in the field.

In illustrative embodiments, the first seat-bottom retainer also provides alignment means for aligning the seat bottom on the first gatefold leg unit to cause the lock means to be arranged so that a user may engage the lock means to block movement of the seat bottom away from the unfolded use position. The second seat-bottom retainer provides alignment means for aligning the seat bottom on the second gatefold leg unit to cause the lock means to be arranged so that a user may engage the lock means to block movement of the seat bottom away from the unfolded use position.

Additional features of the present disclosure will become apparent to those skilled in the art upon consideration of illustrative embodiments exemplifying the best mode of carrying out the disclosure as presently perceived.

BRIEF DESCRIPTION OF THE DRAWINGS

The detailed description particularly refers to the accompanying figures in which:

FIG. 1 is a perspective view of a folding chair in accordance with the present disclosure;

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FIGS. 2-3 illustrate a folding sequence showing movement of a foldable seat bottom from an unfolded use position shown in FIG. 1 to a compact folded storage position shown in FIG. 3;

FIG. 2 is a perspective view similar to FIG. 1 showing upward pivoting movement of the foldable seat bottom about a horizontal pivot axis toward a seat back mounted on a frame included in the folding chair and inward pivoting movement of a foldable first gatefold leg unit about a first vertical pivot axis through a 90° angle in a clockwise direction from an extended position shown in FIG. 1 at a right angle to the frame to a retracted position alongside the seat bottom;

FIG. 3 is a perspective view similar to FIGS. 1 and 2 showing inward pivoting movement of a foldable second gatefold leg unit about a second vertical pivot axis through a 90° angle in a counterclockwise direction from the extended position shown in FIGS. 1 and 2 to the retracted position alongside the already-retracted first gatefold leg unit;

FIG. 4 is a side elevation view taken from the perspective line 4-4 of FIG. 3 showing the seat bottom trapped between the seat back and the two foldable gatefold leg units;

FIG. 5 is a top plan view taken from the perspective of line 5-5 of FIG. 3;

FIG. 6 is an exploded perspective assembly view of components included in the folding chair of FIGS. 1-5 showing the foldable seat bottom, the seat back, the F-shaped foldable first and second gatefold leg units, two spaced-apart seat-bottom retainers under the seat bottom, the frame, and other components that cooperate to support the seat bottom and the gatefold leg units for pivoting movement relative to the frame;

FIG. 7 is an enlarged partial perspective view suggesting coupling of the seat bottom to the first gatefold leg unit through a first seat-bottom retainer that first guides the seat bottom into the unfolded use position and second couples the seat bottom to the first gatefold leg unit to block unintended movement of the seat bottom away from the unfolded use position;

FIG. 8 is a view similar to FIG. 7 showing the seat bottom resting on a seat-bottom support brace and suggesting movement of a locking pin from an unlocked position shown in FIG. 7 toward a locked position in which the locking pin moves into a pin receiver coupled to the seat bottom to interconnect the first gatefold leg unit and the seat bottom as suggested in FIG. 9;

FIG. 9 is a view similar to FIG. 8 showing the locking pin in the locked position mated with the pin receiver;

FIG. 10 is an enlarged partial perspective view showing a first upper hinge unit that interconnects the first gatefold leg unit to the frame to pivot about the first vertical pivot axis;

FIG. 11 is an enlarged partial perspective view showing a first lower hinge unit that cooperates with the first upper hinge unit to interconnect the first gatefold leg unit to the frame to pivot about the first vertical pivot axis and showing a first seat-panel connector unit that interconnects the seat bottom to the frame for pivotable movement about the horizontal pivot axis;

FIG. 12 is a perspective view of a folding bench in accordance with the present disclosure;

FIGS. 12-14 illustrate a folding sequence showing movement of a foldable seat bottom from an unfolded use position shown in FIG. 12 to a compact folded storage position shown in FIG. 14;

FIG. 13 is a perspective view similar to FIG. 12 showing upward pivoting movement of the foldable seat bottom about a horizontal pivot axis toward a seat back mounted on a frame included in the folding bench and inward pivoting movement of a foldable first gatefold leg unit about a first vertical pivot

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axis through a 90° angle in a clockwise direction from an extended position shown in FIG. 12 at a right angle to the frame to a retracted position alongside the seat bottom;

FIG. 14 is a perspective view similar to FIGS. 12 and 13 showing inward pivoting movement of a foldable second gatefold leg unit about a second vertical pivot axis through a 90° angle in a counterclockwise direction from the extended position shown in FIGS. 12 and 13 to the retracted position alongside the already-retracted first gatefold leg unit;

FIG. 15 is a side elevation view taken from the perspective line 15-15 of FIG. 14 showing the seat bottom trapped between the seat back and the two foldable gatefold leg units;

FIG. 16 is a top plan view taken from the perspective of line 5-5 of FIG. 3; and

FIG. 17 is an exploded perspective assembly view of components included in the folding bench of FIGS. 12-16 showing the foldable seat bottom, the seat back, the F-shaped foldable first and second gatefold leg units, two spaced-apart seat-bottom retainers under the seat bottom, the frame, and other components that cooperate to support the seat bottom and the gatefold leg units for pivoting movement relative to the frame.

DETAILED DESCRIPTION

A folding chair 10 in accordance with the present disclosure is shown in an unfolded use position in FIG. 1 and in a compact folded storage position in FIG. 3. A folding bench 510 in accordance with the present disclosure is another wider embodiment of folding chair 10 and is shown in the unfolded use position in FIG. 12 and in the compact folded storage position in FIG. 14. A seat-bottom retainer 16 included in folding chair 10 and folding bench 510 is used to couple a foldable seat bottom 12 (or 512) to foldable first and second gatefold leg units 21, 22 so that unintended movement of the seat bottom away from gatefold leg units 21, 22 is blocked. Illustrative use of seat-bottom retainer 16 is illustrated in FIGS. 7-9.

Folding chair 10 can be folded as suggested in FIGS. 1-5. Folding chair 10 includes a frame 11 and a foldable seat bottom 12 mounted for movement relative to frame 11 between an unfolded use position shown in FIG. 1 and a compact folded storage position shown in FIGS. 3-5. Foldable seat bottom 12 is supported by a retractable seat-bottom support 14 comprising foldable first and second gatefold leg units 21, 22 when folding chair 10 is erected as suggested in FIGS. 1 and 6. Seat bottom 12 is coupled to first and second gatefold leg units 21, 22 by an anchor means 15 comprising first and second seat-bottom retainers 16, 17 so that seat bottom 12 is retained in the unfolded use position.

Folding chair 10 includes a frame 11, a foldable seat bottom 12, and a retractable seat-bottom support 14 as shown, for example, in FIGS. 1-3 and 6. Folding bench 510 also includes a frame 11, a foldable seat bottom 512, and a retractable seat-bottom support 14 as shown, for example, in FIGS. 12-17 and described herein.

Frame 11 includes a backrest 30B comprising a seat back 30 and first and second back-support arms 29, 129 as suggested in FIG. 1. Frame 11 also includes first and second rear legs 28, 128 coupled to backrest 30B and arranged to elevate backrest 30B above ground under backrest 30B as suggested in FIG. 1. Foldable seat bottom 12 is mounted on frame 11 for pivotable movement relative to frame 11 about a horizontal pivot axis 44 between a compact folded storage position alongside backrest 30B (as shown in FIG. 2) and an unfolded use position arranged to extend along a generally horizontal plane away from frame 11 (as shown in FIG. 1). Backrest 30B

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is arranged to extend upwardly away from a rear edge of the foldable seat bottom 12 as shown in FIG. 1. Folding bench 512 includes a backrest 530B as suggested in FIGS. 12 and 13.

Retractable seat-bottom support 14 is configured to provide means for supporting foldable seat bottom 12 in the unfolded use position as suggested in FIG. 1. Retractable seat-bottom support 14 includes first and second gatefold leg units 21, 22 and anchor means 15 for selectively coupling foldable seat bottom 12 in a stationary position on seat-bottom support 14 after pivotable movement of first and second gatefold leg units 21, 22 to the extended positions and pivotable movement of foldable seat bottom 12 to the unfolded use position as suggested in FIGS. 1-3.

First gatefold leg unit 21 is mounted on frame 11 for pivotable movement about a first vertical axis 131 between a retracted position alongside frame 11 as shown in FIG. 2 and an extended position arranged to lie under and support a first side of foldable seat bottom 12 upon movement of foldable seat bottom 12 to the unfolded use position as shown in FIG. 1. First gatefold leg unit 21 is F-shaped in an illustrative embodiment as suggested in FIG. 6.

Second gatefold leg unit 22 is mounted on frame 11 for pivotable movement about a second vertical axis 132 between a retracted position alongside frame 11 as shown in FIG. 3 and an extended position arranged to lie under and support an opposite second side of foldable seat bottom 12 upon movement of foldable seat bottom 12 to the unfolded use position as shown in FIG. 1. Second gatefold unit 22 is F-shaped in an illustrative embodiment as suggested in FIG. 6.

The anchor means 15 comprises a first seat-bottom retainer 16 including a first seat-bottom support brace 18 coupled to first gatefold leg unit 21 to move therewith and arranged to engage and support foldable seat bottom 12 in the unfolded use position and a first seat-bottom lock 20 as suggested in FIGS. 1-3 and 6. The anchor means 15 also includes a second seat-bottom retainer 17 as suggested in FIGS. 1 and 6.

First seat-bottom lock 20 includes a locking-pin receiver 203, a locking-pin carrier 202, and a locking pin 201 as suggested in FIGS. 6-9. Locking-pin receiver 203 is coupled to foldable seat bottom 12 for movement therewith. Locking-pin carrier 202 is coupled to first gatefold leg unit 21 for movement therewith and formed to include a carrier passageway that is aligned as shown in FIGS. 8 and 9 to communicate with a receiver passageway formed in locking-pin receiver 203 upon movement of first gatefold leg unit 21 to the extended position and movement of foldable seat bottom 12 to the unfolded use position. Locking pin 201 is mounted for sliding movement in the carrier passageway between a withdrawn position (see FIG. 7) located outside of the receiver passageway formed in locking-pin receiver 203 to establish an unlocked condition of first seat-bottom retainer 16 to free foldable seat bottom 12 for movement relative to first gatefold leg unit 21 and an inserted position (see FIGS. 8 and 9) arranged to extend into the receiver passageway formed in locking-pin receiver 203 to establish a locked condition of first seat-bottom retainer 16 to block movement of foldable seat bottom 12 relative to first gatefold leg unit 21 and toward the compact folded storage position alongside backrest 30B.

The anchor means 15 further comprises a second seat-bottom retainer 17 including a second seat-bottom support brace 18 coupled to second gatefold leg unit 22 to move therewith and arranged to engage and support foldable seat bottom 12 in the unfolded use position and a second seat-bottom lock 20. The structure of second seat-bottom retainer 17 is similar to the structure of first seat-bottom retainer 16.

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Second seat-bottom lock **20** includes a second locking-pin receiver **203**, a locking-pin carrier **202**, and a locking pin **201**. Locking-pin receiver **203** is coupled to foldable seat bottom **12** for movement therewith. Locking-pin carrier **202** is coupled to second gatefold leg unit **22** for movement therewith and formed to include a second carrier passageway that is aligned to communicate with a second receiver passageway formed in second locking-pin receiver **203** upon movement of second gatefold leg unit **22** to the extended position and movement of foldable seat bottom **12** to the unfolded use position. Second locking pin **201** is mounted for sliding movement in the second carrier passageway between a withdrawn position located outside of the second receiver passageway formed in second locking-pin receiver **203** to establish an unlocked condition of second seat-bottom retainer **17** to free foldable seat bottom **12** for movement relative to second gatefold leg unit **22** and an inserted position arranged to extend into the second receiver passageway formed in second locking-pin receiver **203** to establish a locked condition of second seat-bottom retainer **17** to block movement of foldable seat bottom **12** relative to second gatefold leg unit **22** and toward the compact folded storage position alongside backrest **30B**.

Locking-pin carrier **202** includes a first guide ring **207** coupled to first seat-bottom support brace **18** and a second guide ring **209** coupled to first seat-bottom support brace **18** to lie in spaced-apart relation to first guide ring **207** to define an axle-mover space **210** therebetween as suggested in FIGS. 7-9. Locking pin **201** includes an axle **205** mounted for back-and-forth sliding movement in the carrier passageway formed in first and second guide rings **207**, **209** to extend into the receiver passageway upon movement of locking pin **201** to the inserted position and to lie outside of the receiver passageway upon movement of locking pin **201** to the withdrawn position. Locking pin **201** further includes an axle mover **206** coupled to axle **205** and arranged to extend away therefrom. Axle mover **206** is arranged to move back and forth in axle-mover space **210** defined between first and second guide rings **207**, **209** during movement of locking pin **201** between the inserted and withdrawn positions.

Locking-pin carrier **202** further includes a center guide brace **208** arranged to lie in axle-mover space **210** and coupled to first seat-bottom support brace **18** to lie in a stationary position in axle-mover space **210** between first and second guide rings **207**, **209** as suggested in FIGS. 7-9. Center guide brace **208** is formed to include a mover-receiver slot **212** as shown in FIG. 9. Axle mover **206** is arranged to lie in mover-receiver slot **212** and extend outwardly away from first seat-bottom support brace **18** at about a three o'clock position upon movement of locking pin **201** to the withdrawn position owing to support provided by a portion of center guide brace **208** arranged to lie under axle mover **206**. Axle mover **206** is arranged to lie in a space provided between first guide ring **207** and center guide brace **208** and extend downwardly away from foldable seat bottom **12** at about a six o'clock position upon movement of locking pin **201** to the inserted position.

First seat-bottom support brace **18** includes a horizontal top wall **187** arranged to lie under and face toward foldable seat bottom **12** upon movement of first gatefold leg unit **21** to the extended position and movement of foldable seat bottom **12** to the unfolded use position and a vertical side wall **184** arranged to extend downwardly from horizontal top wall **187** and locking-pin carrier **203** is coupled to vertical side wall **184** as suggested in FIGS. 6-9. First seat-bottom support brace **18** further includes an upright locating pin **182** coupled to top wall **187** and arranged to extend upwardly into a locating-pin aperture **146** formed in foldable seat bottom **12** upon

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movement of first gatefold leg unit **21** to the extended position and movement of foldable seat bottom **12** to the unfolded use position to provide means for aligning the receiver passageway formed in locking-pin receiver **203** coupled to foldable seat bottom **12** with the carrier passageway formed in locking-pin carrier **202** when foldable seat bottom **12** arrives at the unfolded use position and first gatefold leg unit **21** arrives at the extended position so that locking pin **201** can be moved to the inserted position to extend into the receiver passageway.

Foldable seat bottom **12** is configured to provide (as shown in the embodiment of FIGS. 12-17) bench means for seating two people in side-by-side relation between first and second gate-fold leg units **21**, **22** upon movement of first and second gate-fold leg units **21**, **22** to the extended positions and movement of foldable seat bottom **12** to the unfolded use position. Foldable bench **510** is a wider version of foldable chair **12** in accordance with the present disclosure.

Frame **11** includes first and second upright posts **24**, **26** as shown in FIG. 1. In an illustrative embodiment, first upright post **24** includes a rear leg **28** and a back-support arm **29** coupled to rear leg **28** and to a seat back **30** included in folding chair **10**. Second upright post **26** includes a rear leg **128** and a back-support arm **129** coupled to rear leg **128** and to seat back **30**. Seat back **30** is arranged to interconnect and extend between back-support arms **29** and **129** as shown in FIGS. 1 and 6.

Retractable seat-bottom support **14** is coupled to frame **11** as suggested in FIGS. 1 and 5. First gatefold leg unit **21** is included in retractable seat-bottom support **14** and is mounted on frame **11** for movement between an extended position shown in FIG. 1 and a retracted position shown in FIGS. 2-5. Second gatefold leg unit **22** is also included in retractable seat-bottom support **14** and is mounted on frame **11** for movement between an extended position shown in FIGS. 1 and 2 to a retracted position shown in FIGS. 3-5.

First gatefold leg unit **21** includes a front leg **211**, an upper rail **212**, and a lower rail **213** as shown, for example, in FIGS. 5 and 6. In an illustrative embodiment, first gatefold leg unit **21** is F-shaped as shown in FIG. 6. Front leg **211** is arranged to extend vertically and at about right angles to rails **212**, **213**. Upper rail **212** is coupled to an upper portion of front leg **211**. Lower rail **213** is coupled to a middle portion of front leg **211** and arranged to lie in spaced-apart parallel relation to the overlying upper rail **212**.

Second gatefold leg unit **22** includes a front leg **221**, an upper rail **222**, and a lower rail **223** as shown, for example, in FIGS. 1 and 6. In an illustrative embodiment, second gatefold leg unit **22** is F-shaped as shown in FIG. 6. Front leg **221** is arranged to extend vertically and at about right angles to rails **222**, **223**. Upper rail **222** is coupled to an upper portion of front leg **221**. Lower rail **223** is coupled to a middle portion of front leg **221** and arranged to lie in spaced-apart parallel relation to the overlying upper rail **222**.

First seat-bottom retainer **16** is coupled to first gatefold leg unit **21** to move therewith. First seat-bottom retainer **16** is configured to provide means for interconnecting seat bottom **12** and first gatefold leg unit **21** to cause movement of seat bottom **12** away from the unfolded use position to be blocked as desired by a user. Second seat-bottom retainer **17** is configured to provide means for interconnecting seat bottom **12** and second gatefold leg unit **22** to cause movement of seat bottom **12** away from the unfolded use position to be blocked when desired by a user. Second seat-bottom retainer **17** is substantially the same as first seat-bottom retainer **16**, and thus, only first seat-bottom retainer **16** will be discussed in detail.

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First seat-bottom retainer **16** includes a seat-bottom support brace **18** and a seat-bottom lock **20** as shown in FIG. 6. Seat-bottom support brace **18** is configured to provide means for supporting seat bottom **12** when in the unfolded use position and for aligning seat bottom **12** on seat-bottom support brace **18** so that seat-bottom lock **20** may be used to block unintended movement of seat bottom **12** away from seat-bottom support brace **18**.

A user blocks movement of seat bottom **12** from the unfolded use position by moving seat bottom lock **20** from the unlocked position shown in FIGS. 7 and 8 to the locked position shown in FIG. 9. As an example, seat-bottom lock **20** includes a locking pin **201**, a locking-pin carrier **202**, and a locking-pin receiver **203** as illustrated in FIGS. 7-9. Locking-pin carrier **202** is coupled to seat-bottom support brace **18** in a fixed position relative to seat-bottom support brace **18**. Locking pin **201** is coupled to seat-bottom support brace **18** to move back and forth along a locking-pin axis **204** between a withdrawn position shown in FIG. 7 and an inserted position shown in FIG. 9. When locking pin **201** is in the withdrawn position, locking pin **201** is spaced apart from locking-pin receiver. When locking pin **201** is in the inserted position, locking pin **201** is engaged with and received in locking-pin receiver **203**.

Locking pin **201** includes an axle **205** and an axle mover **206** as shown in FIGS. 7-9. Axle **205** is aligned with locking-pin axis **204**. Axle mover **206** is coupled to axle **205** about a midpoint of axle **205** and is arranged to extend away from axle **205** at about a right angle. A user in the field uses axle mover **206** to move axle **205** back and forth between the withdrawn and the inserted positions. As an example, axle mover **206** moves axle **205** in an axially inward direction **48** to move from the withdrawn position of FIG. 7 to the inserted position of FIG. 9.

Axle mover **206** is also used to pivot axle **205** about locking-pin axis **204** between a freed position as shown in FIGS. 7 and 8 and a blocked position shown in FIG. 9. When axle **205** is rotated to the freed position, axle mover **206** is arranged to extend outwardly from axle **205** at about a three o'clock position as illustrated in FIG. 7. When axle **205** is rotated in a clockwise direction **46** about locking-pin axis **204** to the blocked position, axle mover **206** is arranged to extend outwardly from axle **205** at about the six o'clock position. When locking pin **201** is in the blocked position, movement of axle **205** along locking-pin axis **204** is blocked as a result of axle mover **206** being trapped between either a first guide ring **207** and a center guide brace **208** or a second guide ring **209** and center guide brace **208** as shown in FIGS. 7-9.

Locking-pin receiver **203** is illustratively a hollow cylinder coupled to a lower surface **138** of panel perimeter **122**. Locking-pin receiver **203** is formed to include a pin passageway **140** and first and second pin-receiving apertures **142** that open into pin passageway **140** so that axle **205** may move along locking-pin axis **204**, pass through first pin-receiving aperture **142** and enter pin passageway **140** so that seat bottom **12** will be interconnected with retractable seat-bottom support **14**.

Seat-bottom support brace **18** illustratively includes a support **181** and a locating pin **182** as shown in FIGS. 7-9. Support **181** includes a triangular first bracket **183**, a triangular second bracket **184**, a bracket mount **185**, and a flange **186** as shown in FIGS. 7-9. Mount **185** is coupled to an inner surface **144** of front leg **211** of foldable first gatefold leg unit **21**. First bracket **183** is coupled to mount **185** and arranged to extend away from gatefold leg unit **21** toward gatefold leg unit **22**. Second bracket **184** is spaced apart from first bracket **183**. Flange **186** is coupled to bracket mount **185** and brackets **183**, **184** to establish a flat horizontal surface **187** that lies in

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confronting relation with lower surface **138** of panel perimeter **122** as shown in FIGS. 2 and 4.

Locating pin **182** of seat-bottom support brace **18** is coupled to flange **186** and arranged to extend upwardly toward lower surface **138** of panel perimeter **122**. Lower surface **138** of panel perimeter **122** is formed to include a locating-pin aperture **146** which is configured to receive locating pin **182** therein when seat bottom **12** is in the unfolded use position. Locating pin **182** and locating-pin aperture **146** cooperate to provide means for guiding seat bottom **12** into the unfolded use position and aligning locking-pin receiver **203** along locking-pin axis **204** so that locking pin **201** may be moved to the inserted position and then rotated to the blocked position so that seat bottom **12** is retained in the unfolded use position.

Before seat bottom **12** is moved from the compact folded storage position shown in FIG. 3 to the unfolded use position shown in FIG. 1, foldable first and second gatefold leg units **21**, **22** are moved from the retracted positions shown in FIG. 3 to the extended positions shown in FIG. 1. Movement of foldable first and second gatefold units **21**, **22** is achieved by using companion first and second hinges **31**, **32** as suggested in FIG. 2.

First hinge **31** is also included in folding chair **10** and configured to support first gatefold leg unit **21** for pivoting movement in a clockwise direction about first vertical pivot axis **131** relative to frame **11** as suggested in FIGS. 1 and 2. In an illustrative embodiment, first hinge **31** is coupled to first gatefold leg unit **21** and to rear leg **28** of first upright post **24** included in frame **11**. First hinge **31** provides means for supporting first gatefold leg unit **21** for movement relative to frame **11** between an extended position shown in FIGS. 1 and 6 and a retracted position shown in FIGS. 2-5.

Second hinge **32** is also included in folding chair **10** and is configured to support second gatefold leg unit **22** for pivoting movement in a counter-clockwise direction **50** about second vertical pivot axis **132** relative to frame **11** as suggested in FIG. 2 and shown in FIG. 3. In an illustrative embodiment, second hinge **32** is coupled to second gatefold leg unit **22** and to rear leg **128** of second upright post **26** included in frame **11**. Second hinge **32** provides means for supporting second gatefold leg unit **22** for movement relative to frame **11** between an extended position shown in FIGS. 1 and 6 and a retracted position shown in FIGS. 2-5.

As suggested in FIG. 1, when moved to their extended positions, first and second gatefold leg units **21**, **22** cooperate to provide means for supporting seat bottom **12** in a substantially horizontal extended use position. When moved to their retracted positions alongside frame **11**, first and second gatefold leg units **21**, **22** cooperate to retain seat bottom **12** in the compact folded storage position by trapping seat bottom **12** between seat back **30** and foldable first gatefold leg unit **21** as shown in FIGS. 2-5. When first and second gatefold leg units **21**, **22** of folding seat **10** are in the extended positions, gatefold leg units **21**, **22** are spaced from one another a first distance **58**. When first and second gatefold leg units **21**, **22** of folding seat **10** are in the retracted positions, gatefold leg units **21**, **22** are arranged to overlap one another and lie in confronting relation to one another as illustrated in FIG. 3.

In an illustrative embodiment, first hinge **31** includes an upper hinge unit **31U** associated with upper rail **212** of first gatefold leg unit **21** and a lower hinge unit **31L** associated with lower rail **213** of first gatefold leg unit **21** as suggested in FIGS. 1 and 6. As shown best in FIG. 6, upper hinge unit **31U** includes a hinge pin **34** and a pin mount **36** coupled to upper rail **212** of foldable first gatefold leg unit **21**. Hinge pin **34** is sized to pass through pin-receiving apertures formed in pin

mount 36 and a mount rail 214 included in foldable first gatefold leg unit 21 to establish first vertical pivot axis 131. Similarly, lower hinge unit 31L includes a hinge pin 134 and a pin mount 136 coupled to lower rail 213.

In an illustrative embodiment, second hinge 32 includes an upper hinge unit 32U associated with upper rail 272 of second gatefold leg unit 22 and a lower hinge unit 32L associated with lower rail 23 of second gatefold leg unit 22 as suggested in FIG. 2. As shown best in FIG. 6, upper hinge unit 32U includes a hinge pin 234 and a pin mount 236 coupled to upper rail 222 of foldable first gatefold leg unit 21. Hinge pin 234 is sized to pass through pin-receiving apertures formed in pin mount 236 and a mount rail 216 included in foldable first gatefold leg unit 22 to establish second vertical pivot axis 132. Similarly, lower hinge unit 32L includes a hinge pin 334 and a pin mount 346 coupled to lower rail 223.

Each of pin mounts 36, 136, 236, and 336 is formed to include a rail-receiving space as suggested in FIGS. 10 and 11. Each pin mount includes a top panel (TP) formed to receive a pin-receiving aperture, a bottom panel (BP) formed to receive a pin-receiving aperture, and a side panel (SP) arranged to interconnect the companion top and bottom panels (TP, BP) and to retain the companion top and bottom panels (TP, BP) in spaced-apart parallel relation to one another to form a rail-receiving space therebetween.

Each pin mount 36, 136, 236, and 336 is arranged to form a rail-pivot shield and to receive a free end of its companion mount rail 214, 215, 216, and 217 therein during movement of first and second gatefold leg units 21, 22 relative to frame 11 as suggested in FIGS. 1-4. Mount rails 214, 215 are included in first gatefold leg unit 21 and mount rails 216, 217 are included in second gatefold leg unit 22. The rail-pivot shield feature provided by pin mounts 36, 136, 236, and 336 provides means for shielding the companion hinge pins from exposure to any person that is handling folding chair 10 while seat bottom 12 and gatefold leg units 21, 22 are folded and unfolded.

Seat back 30 includes a back pad 300 and a pad perimeter 302 as suggested in FIGS. 1 and 6. In an illustrative embodiment, pad perimeter 302 is made of metal and back pad 300 is made of metal and formed to include a plurality of spaced-apart drain holes 304. However, pad perimeter 302 may be made of metal and back pad 300 may comprise a series of wooden slats extending horizontally across pad perimeter 302. In another example, pad perimeter 302 may be made of metal and back pad 300 may comprise a series of metal slats, however, seat back 30 may be made of any other suitable material. In the illustrated embodiment, pad perimeter 302 of seat back 30 is welded to back-support arm 29 of first upright post 24 of frame 11 and to back-support arm 129 of second upright post 26 of frame 11.

Seat bottom 12 includes a panel 120 and panel perimeter 122 as suggested in FIG. 6. In an illustrative embodiment, panel perimeter 122 is made primarily of metal and panel 120 is made of metal formed to include a series of drain holes 124 spaced apart from one another. In another embodiment, panel perimeter 122 and panel 120 may be made of wood and panel 120 may comprise a series of slats extending horizontally across panel perimeter 122, however, seat bottom 12 may be made of any other suitable material.

A seat-bottom mover 40 is included in folding chair 10 and coupled to seat bottom 12 and frame 11 as suggested in FIGS. 2, 3, 6, and 11. Seat-bottom mover 40 is configured to provide means for guiding seat bottom 12 from the extended use position shown in FIGS. 1 and 6 to a raised position shown in FIGS. 2-5 (to facilitate folding of first and second gatefold leg

units 21, 22 to retracted positions alongside seat bottom 12) so that the compact folded storage position shown in FIGS. 3-5 is achieved.

Seat-bottom mover 40 includes first and second panel connectors 41, 42 as shown in FIG. 6. First panel connector 41 includes a link rail 411 and a rail pivot pin 412. A first end of link rail 411 is coupled to panel perimeter 122 to move therewith. Link rail 411 is arranged to extend upwardly away from panel perimeter 122 toward backrest perimeter 302. Link rail 411 is coupled to backrest perimeter 302 by rail pivot pin 412 which extends through an aperture formed in link rail 411 so that link rail 411 and seat bottom 12 may pivot about horizontal seat-bottom pivot axis 44 as shown in FIG. 11. Second panel connector 42 is substantially the same as first panel connector 41, and thus, only first panel connector 41 is discussed in detail.

As suggested in, for example, FIGS. 2-5, seat bottom 12 can be moved about horizontal seat-bottom pivot axis 44 relative to frame 11 to assume a retracted position. In this position, foldable first and second gatefold leg units 21, 22 may be moved from the extended position of FIGS. 1 and 6 to the retracted position of FIGS. 2-5. After foldable first and second gatefold leg units 21, 22 are in the retracted position, foldable first gatefold leg unit 21 and seat back 30 cooperate to provide therebetween chamber means for storing portions of seat bottom 12 therein as suggested in FIGS. 2-5.

In an illustrative embodiment, each of first and second gatefold leg units 21, 22 is mated to frame 11 using two hinge units 31U, 31L or 32U, 32L. This functions to strengthen each gatefold leg unit 21, 22 with a rigid cross brace and minimizes rocking motion without otherwise detracting from appearance or function. Also, leg units 21, 22 fold like a gate on hinges 31, 32 attached to rear legs 28, 128. Seat bottom 12 pivots up out of the way before gatefold leg units 21, 22 are folded from the extended positions to the retracted positions.

A folding bench 510 in accordance with the present disclosure can be folded as suggested in FIGS. 12-16. Folding bench 510 is a long seat for more than one person. Folding bench 510 includes frame 11 and a foldable seat bottom 512 mounted for movement relative to frame 11 between an unfolded use position shown in FIG. 12 and a compact folded storage position shown in FIGS. 14-16. Foldable seat bottom 512 is supported by retractable seat-bottom support 14 comprising foldable first and second gatefold leg units 21, 22 when folding bench 510 is erected as suggested in FIGS. 12 and 17. Seat bottom 512 is coupled to first and second gatefold leg units 21, 22 by first and second seat-bottom retainers 16, 17 so that seat bottom 512 is retained in the unfolded use position.

Frame 11 includes first and second upright posts 24, 26 as shown in FIG. 12. In an illustrative embodiment, first upright post 24 includes rear leg 28 and back-support arm 29 coupled to rear leg 28 and to a seat back 530 included in folding bench 510. Second upright post 26 includes rear leg 128 and back-support arm 129 coupled to rear leg 128 and to seat back 530. Seat back 530 is arranged to interconnect and extend between back-support arms 29 and 129 as shown in FIG. 17.

Retractable seat-bottom support 14 is coupled to frame 11 as suggested in FIGS. 1 and 5. First gatefold leg unit 21 is included in retractable seat-bottom support 14 and is mounted on frame 11 for movement between an extended position shown in FIG. 12 and a retracted position shown in FIGS. 13-16. Second gatefold leg unit 22 is also included in retractable seat-bottom support 14 and mounted on frame 11 for movement between an extended position shown in FIGS. 12 and 13 and a retracted position shown in FIGS. 14-16.

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First gatefold leg unit **21** includes front leg **211**, upper rail **212**, and lower rail **213** as shown, for example, in FIGS. **16** and **17**. In an illustrative embodiment, first gatefold leg unit **21** is F-shaped as shown in FIGS. **12** and **17**. Front leg **211** is arranged to extend vertically and at about right angles to rails **212**, **213**. Upper rail **212** is coupled to an upper portion of front leg **211**. Lower rail **213** is coupled to a middle portion of front leg **211** and arranged to lie in spaced-apart parallel relation to the overlying upper rail **212**.

Second gatefold leg unit **22** includes front leg **221**, upper rail **222**, and lower rail **223** as shown, for example, in FIGS. **12** and **17**. In an illustrative embodiment, second gatefold leg unit **22** is F-shaped as shown in FIG. **17**. Front leg **221** is arranged to extend vertically and at about right angles to rails **222**, **223**. Upper rail **222** is coupled to an upper portion of front leg **221**. Lower rail **223** is coupled to a middle portion of front leg **221** and arranged to lie in spaced-apart parallel relation to the overlying upper rail **222**.

First seat-bottom retainer **16** is coupled to first gatefold leg unit **21** to move therewith. First seat-bottom retainer **16** is configured to provide means for interconnecting seat bottom **512** and first gatefold leg unit **21** to cause movement of seat bottom **512** from the unfolded use position to be blocked when desired by a user. Second seat-bottom retainer **17** is configured to provide means for interconnecting seat bottom **512** and second gatefold leg unit **22** to cause movement of seat bottom **512** from the unfolded use position to be blocked when desired by a user. Second seat-bottom retainer **17** is substantially the same as first seat-bottom retainer **16**, and thus, only first seat-bottom retainer **16** will be discussed in detail.

As shown in FIG. **17**, first seat-bottom retainer **16** includes seat-bottom support brace **18** and seat-bottom lock **20**. Seat-bottom support brace **18** is configured to provide means for supporting seat bottom **512** when in the unfolded use position and for aligning seat bottom **512** on seat-bottom support brace **18** so that seat-bottom lock **20** may be used.

A user blocks movement of seat bottom **512** by moving seat bottom lock **20** from the unlocked position of FIGS. **7** and **8** to the locked position of FIG. **9**. As an example, seat-bottom lock **20** includes locking pin **201**, locking-pin carrier **202**, and locking-pin receiver **203** as illustrated in FIGS. **7-9**. Locking-pin carrier **202** is coupled to seat-bottom support brace **18** in the fixed position relative to seat-bottom support brace **18**. Locking pin **201** is coupled to seat-bottom support brace **18** to move back and forth along locking-pin axis **204** between the withdrawn position shown in FIG. **7** and the inserted position shown in FIG. **9**. When locking pin **201** is in the withdrawn position, locking pin **201** is spaced apart from locking-pin receiver **203**. When locking pin **201** is in the inserted position, locking pin **201** is engaged with and received in locking-pin receiver **203**.

Locking pin **201** includes axle **205** and axle mover **206** as shown in FIGS. **7-9**. Axle **205** is aligned with locking-pin axis **204**. Axle mover **206** is coupled to axle **205** about the midpoint of axle **205** and is arranged to extend away from axle **205** at about the right angle. A user in the field uses axle mover **206** to move axle **205** back and forth between the withdrawn and the inserted positions. As an example, axle mover **206** moves axle **205** in an axially inward direction **48** to move from the withdrawn position of FIG. **7** to the mated position of FIG. **9**.

Axle mover **206** is also used to pivot axle **205** about locking-pin axis **204** between a freed position as shown in FIGS. **7** and **8** and a blocked position shown in FIG. **9**. When axle **205** is rotated to the freed position, axle mover **206** is arranged to extend outwardly from axle **205** at about a three o'clock

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position as illustrated in FIG. **7**. When axle **205** is rotated in a clockwise direction **46** about locking-pin axis **204** to the blocked position, axle mover **206** is arranged to extend outwardly from axle **205** at about the six o'clock position. When locking pin **201** is in the blocked position, movement of axle **205** along locking-pin axis **204** is blocked as a result of axle mover **206** being trapped between either first guide ring **207** and center guide brace **208** or second guide ring **209** and center guide brace **208** as shown in FIGS. **7-9**.

Locking-pin receiver **203** is illustratively hollow cylinder coupled to lower surface **138** of panel perimeter **5122**. Locking-pin receiver **203** is formed to include pin passageway **140** and first and second pin-receiving apertures **142** that open into pin passageway **140** so that axle **205** may move along locking-pin axis **204**, pass through first pin-receiving aperture **142** and enter pin passageway **140** so that seat bottom **512** will be interconnected with retractable seat-bottom support **14**.

Seat-bottom support brace **18** illustratively includes support **181** and locating pin **182** as shown in FIGS. **7-9**. Support **181** includes triangular first bracket **183**, triangular second bracket **184**, bracket mount **185**, and flange **186** as shown in FIGS. **7-9**. Mount **185** is coupled to inner surface **144** of front leg **211** of foldable first gatefold leg unit **21**. First bracket **183** is coupled to mount **185** and is arranged to extend away from gatefold leg unit **21** toward gatefold leg unit **22**. Second bracket **184** is spaced apart from first bracket **183**. Flange **186** is coupled to bracket mount **185** and brackets **183**, **184** to establish a flat horizontal surface **187** that lies in confronting relation with lower surface **5138** of panel perimeter **5122** as shown in FIGS. **13** and **15**.

Locating pin **182** is coupled to flange **186** and arranged to extend upwardly toward lower surface **5138** of panel perimeter **5122**. Lower surface **5138** is formed to include locating-pin aperture **146** which is configured to receive locating pin **182** therein when seat bottom **512** is in the unfolded use position. Locating pin **182** and locating-pin aperture **146** cooperate to provide means for guiding seat bottom **512** into the unfolded use position and aligning locking-pin receiver **203** along locking-pin axis **204** so that locking pin **201** may be move to the mated position and blocked positions so that the seat bottom is retained in the unfolded use position.

Before seat bottom **512** is moved from the compact folded storage position shown in FIG. **14** to the unfolded use position shown in FIG. **12**, foldable first and second gatefold leg units **21**, **22** are moved from the retracted positions shown in FIG. **14** to the extended position shown in FIG. **1**. Movement of foldable first and second gatefold units **21**, **22** is achieved by using companion first and second hinges **31**, **32** as suggested in FIG. **2**.

First hinge **31** is also included in folding bench **510** and is configured to support first gatefold leg unit **21** for pivoting movement in a clockwise direction about first vertical pivot axis **131** relative to frame **11** as suggested in FIGS. **1** and **2**. In an illustrative embodiment, first hinge **31** is coupled to first gatefold leg unit **21** and to rear leg **28** of first upright post **24** included in frame **11**. First hinge **31** provides means for supporting first gatefold leg unit **21** for movement relative to frame **11** between the extended position shown in FIGS. **12** and **17** and the retracted position shown in FIGS. **13-16**.

Second hinge **32** is also included in folding bench **510** and is configured to support second gatefold leg unit **22** for pivoting movement in a counter-clockwise direction **50** about second vertical pivot axis **132** relative to frame **11** as suggested in FIG. **13** and shown in FIG. **14**. In an illustrative embodiment, second hinge **32** is coupled to second gatefold leg unit **22** and to rear leg **128** of second upright post **26** included in frame **11**. Second hinge **32** provides means for

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supporting second gatefold leg unit 22 for movement relative to frame 11 between the extended position shown in FIGS. 1 and 6 and the retracted position shown in FIGS. 2-5.

As suggested in FIG. 1, when moved to their extended positions, first and second gatefold leg units 21, 22 cooperate to provide means for supporting seat bottom 512 in a substantially horizontal extended use position. When moved to their retracted positions alongside frame 11, first and second gatefold leg units 21, 22 cooperate to retain seat bottom 12 in the compact folded storage position. As shown in FIG. 14, seat bottom 512 is positioned to lie between seat back 530 and first and second gatefold leg units 21, 22. When first and second gatefold leg units 21, 22 of folding bench 510 are in the extended positions, gatefold leg units 21, 22 are spaced from one another a first distance 52. When first and second gatefold leg units 21, 22 of folding bench 510 are in the retracted positions, gatefold leg units 21, 22 are spaced apart from one another a relatively larger second distance 54 so as to define a space 56 therebetween as shown in FIG. 14.

In an illustrative embodiment, first hinge 31 includes upper hinge unit 31U associated with upper rail 212 of first gatefold leg unit 21 and lower hinge unit 31L associated with lower rail 213 of first gatefold leg unit 21 as suggested in FIGS. 12 and 17. As shown best in FIG. 17, upper hinge unit 31U includes hinge pin 34 and pin mount 36 coupled to upper rail 212 of foldable first gatefold leg unit 21. Hinge pin 34 is sized to pass through pin-receiving apertures formed in pin mount 36 and mount rail 214 included in foldable first gatefold leg unit 21 to establish first vertical pivot axis 131. Similarly, lower hinge unit 31L includes hinge pin 134 and pin mount 136 coupled to lower rail 213.

In an illustrative embodiment, second hinge 32 includes upper hinge unit 32U associated with upper rail 272 of second gatefold leg unit 22 and lower hinge unit 32L associated with lower rail 23 of second gatefold leg unit 22 as suggested in FIG. 13. As shown best in FIG. 17, upper hinge unit 32U includes hinge pin 234 and pin mount 236 coupled to upper rail 222 of foldable first gatefold leg unit 21. Hinge pin 234 is sized to pass through pin-receiving apertures formed in pin mount 236 and mount rail 216 included in foldable first gatefold leg unit 22 to establish second vertical pivot axis 132. Similarly, lower hinge unit 32L includes hinge pin 334 and pin mount 346 coupled to lower rail 223.

Each of pin mounts 36, 136, 236, and 336 is formed to include a rail-receiving space as suggested in FIGS. 10 and 11. Each pin mount includes top panel (TP) formed to receive a pin-receiving aperture, bottom panel (BP) formed to receive a pin-receiving aperture, and side panel (SP) arranged to interconnect the companion top and bottom panels (TP, BP) and to retain the companion top and bottom panels (TP, BP) in spaced-apart parallel relation to one another to form the rail-receiving space therebetween.

Each pin mount 36, 136, 236, and 336 is arranged to form the rail-pivot shield and to receive the free end of its companion mount rail 214, 215, 224, and 225 therein during movement of first and second gatefold leg units 21, 22 relative to frame 11 as suggested in FIGS. 12-15. The rail-pivot shield feature provided by pin mounts 36, 136, 236, and 336 provides means for shielding the companion hinge pins from exposure to any person that is handling folding bench 510 while seat bottom 512 and gatefold leg units 21, 22 are folded and unfolded.

Seat back 530 includes back pad 5300 and pad perimeter 5302 as suggested in FIGS. 12 and 17. In an illustrative embodiment, pad perimeter 5302 is made of metal and back pad 5300 is made of metal and formed to include a plurality of spaced-apart drain holes 304. However, pad perimeter 5302

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may be made of metal and back pad 5300 may comprise a series of wooden slats extending horizontally across pad perimeter 5302. In another example, pad perimeter 5302 may be made of metal and back pad 5300 may comprise a series of metal slats, however, seat back 530 may be made of any other suitable material. In the illustrated embodiment, pad perimeter 5302 of seat back 530 is welded to back-support arm 29 of first upright post 24 of frame 11 and to back-support arm 129 of second upright post 26 of frame 11.

Seat bottom 512 includes a panel 5120 and panel perimeter 5122 as suggested in FIG. 17. In an illustrative embodiment, panel perimeter 5122 is made of metal and panel 5120 is made of metal formed to include a series of drain holes 124 spaced apart from one another. In another embodiment, panel perimeter 5122 and panel 5120 may be made of wood and panel 5120 may comprise a series of slats extending horizontally across panel perimeter 5122.

Seat-bottom mover 40 is included in folding bench 510 and is coupled to seat bottom 512 and frame 11 as suggested in FIGS. 12 and 17. Seat-bottom mover 40 is configured to provide means for guiding seat bottom 512 from the extended use position shown in FIGS. 12 and 17 to the raised position shown in FIGS. 13-16 (to facilitate folding of first and second gatefold leg units 21, 22 to retracted positions alongside seat bottom 512) so that the compact folded storage position shown in FIGS. 14-16 is achieved.

Seat-bottom mover 40 includes first and second panel connectors 41, 42 as shown in FIG. 17. First panel connector 41 includes link rail 411 and rail pivot pin 412. First end of link rail 411 is coupled to panel perimeter 5122 to move therewith. Link rail 411 is arranged to extend upwardly away from panel perimeter 5122 toward backrest perimeter 5302. Link rail 411 is coupled to backrest perimeter 5302 by rail pivot pin 412 which extends through the aperture formed in link rail 411 so that link rail 411 and seat bottom 12 may pivot about horizontal seat-bottom pivot axis 44 as shown in FIG. 11.

As suggested in, for example, FIGS. 13-16, seat bottom 512 can be moved about horizontal seat-bottom pivot axis 44 relative to frame 11 to assume a retracted position. In this position, foldable first and second gatefold leg units 21, 22 may be moved from the extended position of FIGS. 12 and 17 to the retracted position of FIGS. 13-16. After foldable first and second gatefold leg units 21, 22 are in the retracted position, foldable first and second gatefold leg units 21, 22 and seat back 530 cooperate to provide therebetween chamber means for storing portions of seat bottom 512 therein as suggested in FIGS. 13-16.

In an illustrative embodiment, each of first and second gatefold leg units 21, 22 is mated to frame 11 using two hinge units 31U, 31L or 32U, 32L. This functions to strengthen each gatefold leg unit 21, 22 with a rigid cross brace and minimizes rocking motion without otherwise detracting from appearance or function. Also, leg units 21, 22 fold like a gate on hinges 31, 32 attached to rear legs 28, 128. Seat bottom 512 pivots up out of the way before gatefold leg units 21, 22 are folded from the extended positions to the retracted positions.

The invention claimed is:

1. A folding chair comprising

a frame includes a backrest and first and second rear legs coupled to the backrest and arranged to elevate the backrest above ground under the backrest,

a foldable seat bottom mounted on the frame for pivotable movement relative to the frame about a horizontal pivot axis between a compact folded storage position alongside the backrest and an unfolded use position arranged to extend along a generally horizontal plane away from

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the frame wherein the backrest is arranged to extend upwardly away from a rear edge of the foldable seat bottom, and

a retractable seat-bottom support configured to provide means for supporting the foldable seat bottom in the unfolded use position, the retractable seat-bottom support includes

a first gatefold leg unit mounted on the frame for pivotable movement about a first vertical axis between a retracted position alongside the frame and an extended position arranged to lie under and support a first side of the foldable seat bottom upon movement of the foldable seat bottom to the unfolded use position,

a second gatefold leg unit mounted on the frame for pivotable movement about a second vertical axis between a retracted position alongside the frame and an extended position arranged to lie under and support an opposite second side of the foldable seat bottom upon movement of the foldable seat bottom to the unfolded use position, and

an anchor means for selectively coupling the foldable seat bottom in a stationary position on the seat-bottom support after pivotable movement of the first and second gatefold leg units to the extended positions and pivotable movement of the foldable seat bottom to the unfolded use position, wherein the anchor means comprises a first seat-bottom retainer including a first seat-bottom support brace coupled to the first gatefold leg unit to move therewith and arranged to engage and support the foldable seat bottom in the unfolded use position and a first seat-bottom lock including a locking-pin receiver coupled to the foldable seat bottom for movement therewith, a locking-pin carrier coupled to the first gatefold leg unit for movement therewith and formed to include a carrier passageway that is aligned to communicate with a receiver passageway formed in the locking-pin receiver upon movement of the first gatefold leg unit to the extended position and movement of the foldable seat bottom to the unfolded use position, and a locking pin mounted for sliding movement in the carrier passageway between a withdrawn position located outside of the receiver passageway formed in the locking-pin receiver to establish an unlocked condition of the first seat-bottom retainer to free the foldable seat bottom for movement relative to the first gatefold leg unit and an inserted position arranged to extend into the receiver passageway formed in the locking-pin receiver to establish a locked condition of the first seat-bottom retainer to block movement of the foldable seat bottom relative to the first gatefold leg unit and toward the compact folded storage position alongside the backrest,

wherein in the compact storage position of the foldable seat bottom and the retracted position of each of the first and second gatefold units, the foldable seat bottom is arranged between the backrest and the first and second gatefold units.

2. The folding chair of claim 1, wherein the anchor means further comprises a second seat-bottom retainer including a second seat-bottom support brace coupled to the second gatefold leg unit to move therewith and arranged to engage and support the foldable seat bottom in the unfolded use position and a second seat-bottom lock including a second locking-pin receiver coupled to the foldable seat bottom for movement therewith, a second locking-pin carrier coupled to the second gatefold leg unit for movement therewith and formed to include a second carrier passageway that is aligned to communicate with a second receiver passageway formed in the

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second locking-pin receiver upon movement of the second gatefold leg unit to the extended position and movement of the foldable seat bottom to the unfolded use position, and a second locking pin mounted for sliding movement in the second carrier passageway between a withdrawn position located outside of the second receiver passageway formed in the second locking-pin receiver to establish an unlocked condition of the second seat-bottom retainer to free the foldable seat bottom for movement relative to the second gatefold leg unit and an inserted position arranged to extend into the second receiver passageway formed in the second locking-pin receiver to establish a locked condition of the second seat-bottom retainer to block movement of the foldable seat bottom relative to the second gatefold leg unit and toward the compact folded storage position alongside the backrest.

3. The folding chair of claim 1, wherein the foldable seat bottom is configured to provide bench means for seating two people in side-by-side relation between the first and second gate-fold leg units upon movement of the first and second gate-fold leg units to the extended positions and movement of the foldable seat bottom to the unfolded use position.

4. The folding chair of claim 1, wherein the first gatefold leg unit is mounted on the frame by hinged attachment to at least one first mount rail, the at least one first mount rail being rigidly attached to the frame and the hinged attachment defining the first vertical axis.

5. The folding chair of claim 4, wherein the second gatefold leg unit is mounted on the frame by hinged attachment to at least one second mount rail, the at least one second mount rail being rigidly attached to the frame and the hinged attachment defining the second vertical axis.

6. The folding chair of claim 5, wherein each of the at least one first mount rail and the at least one second mount rail has a first end which is coupled to the frame and a second end which extends away from the frame to define the respective first and second vertical axis and each has an extension length defined between the first and second ends, and wherein the extension length of one of the at least one first mount rail and the at least second mount rail is longer than the other.

7. The folding chair of claim 4, wherein the hinged attachment is formed by reception of a free end of the at least one first mount rail into a first mount rail-receiving space defined within exterior portions of first gatefold unit, and wherein each of the free end of the at least one first mount rail and the exterior portions of the first gatefold unit which define the first mount rail-receiving space include a pin bore penetrating therethrough and corresponding to each other to receive a hinged pin when the free end of the at least one first mount rail is arranged within the first mount rail-receiving space.

8. The folding chair of claim 1, wherein the foldable seat bottom includes a link rail rigidly attached thereto and extending outwardly from the foldable seat bottom, the link rail being configured for rotatable connection to the frame.

9. A folding chair comprising

a frame includes a backrest and first and second rear legs coupled to the backrest and arranged to elevate the backrest above ground under the backrest,

a foldable seat bottom mounted on the frame for pivotable movement relative to the frame about a horizontal pivot axis between a compact folded storage position alongside the backrest and an unfolded use position arranged to extend along a generally horizontal plane away from the frame wherein the backrest is arranged to extend upwardly away from a rear edge of the foldable seat bottom, and

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- a retractable seat-bottom support configured to provide means for supporting the foldable seat bottom in the unfolded use position, the retractable seat-bottom support includes
- a first gatefold leg unit mounted on the frame for pivotable movement about a first vertical axis between a retracted position alongside the frame and an extended position arranged to lie under and support a first side of the foldable seat bottom upon movement of the foldable seat bottom to the unfolded use position,
- a second gatefold leg unit mounted on the frame for pivotable movement about a second vertical axis between a retracted position alongside the frame and an extended position arranged to lie under and support an opposite second side of the foldable eat bottom upon movement of the foldable seat bottom to the unfolded use position, and
- a locking device comprising a first seat-bottom retainer including a first seat-bottom support brace coupled to the first gatefold leg unit to move therewith and arranged to engage and support the foldable seat bottom in the unfolded use position and a first seat-bottom lock including a locking-pin receiver coupled to the foldable

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seat bottom for movement therewith, a locking-pin carrier coupled to the first seat bottom support brace for movement therewith and formed to include a carrier passageway that is aligned to communicate with a receiver passageway formed in the locking-pin receiver upon movement of the first gatefold leg unit to the extended position and movement of the foldable seat bottom to the unfolded use position, and a locking pin mounted for sliding movement in the carrier passageway between a withdrawn position located outside of the receiver passageway formed in the locking-pin receiver to establish an unlocked condition of the first seat-bottom retainer to free the foldable seat bottom for movement relative to the first gatefold leg unit and an inserted position arranged to extend into the receiver passageway formed in the locking-pin receiver to establish a locked condition of the first seat-bottom retainer to block movement of the foldable seat bottom relative to the first gatefold leg unit and toward the compact folded storage position alongside the backrest,

wherein the backrest is connected fixedly to the first and second rear legs.

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